

Navigation in large Web Sites

- three cases of Internet News Publishing

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Abstract

The purpose of this thesis is to study a number of design principles for navigation support (the means that exist to help the users to find their way within a web site) and how this support is used by first time users in an online newspaper environment. I have chosen to study the web sites of three different newspapers located in different countries in Scandinavia: Jyllands-Posten in Denmark, Göteborgs-Posten in Sweden and Dagbladet in Norway. First some design principles for good navigation support were defined through literature studies: landmarks, consistency, metaphor, URLs, titles and sitemaps/TOCs, followed by an evaluation of each web site. Interviews at each newspaper were then conducted and finally a usability test with a test group of twelve participants was carried out. The main question of this thesis is: *How is it possible to reduce cognitive overhead in an online newspaper web site for first time users?* The results have shown that Jylland-Posten has succeeded best in this context and that the Dagbladet web site “grows” on you after a while. By using the newspaper metaphor and providing navigation support that is consistent in its placement all over the web site and by providing clear and distinct labelling of the different sections serving as landmarks will help reduce cognitive overhead, according to the usability test conducted.

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1. Introduction

The growth of the WWW and its many web sites has provided us with massive amounts of information. Web sites in turn becomes larger and larger. When a web site grows, the risk for getting “lost in hyperspace” increases, i.e. the user can feel disoriented, not knowing exactly where in the web site he currently is or how to get to a specific node of information. He may lose the overall picture of the web site structure (Edwards & Hardman, 1989; Gay & Mazur, 1991; Kindborg, 1991; Shneiderman & Kearsley, 1989 and Nielsen, 1995).

One example of web sites that have gradually become larger and larger is the online newspapers (Eriksen & Ihlström, 1999). These web sites approach a broad audience, not a specific, narrow target group. They also offer more and more services to their users. When a web site grows into a large-scale information site it becomes important to provide efficient navigation support to the users (Sano, 1996; Shneiderman, 1997; Rosenfeld & Morville, 1998 and Nielsen, 1998). I define navigation support as the means that exist to help the user to find their way within a web site. For example navigation bars, sitemaps, logical URLs (Uniform Resource Locators), titles and so on. Online newspapers differ from many other web sites by having users who return regularly on a daily basis. This makes it even more important to provide navigation support that feels intuitive for both first time and regular users.

I have chosen to make a study of the kind of navigation support online newspapers provide for their users and to what extent the users make use of it. Eriksen (1997) conducted a study of three online newspapers in 1996, which focused on how WWW technology was used to produce digital documents and how work was organised in relation to the documents produced. By including the same newspapers in my study it gives an interesting longitudinal perspective. The newspapers are located in three different countries in Scandinavia: Jyllands-Posten in Denmark, Göteborgs-Posten in Sweden and Dagbladet in Norway.

The main purpose of this thesis is to study a number of design principles for navigation support and how this support is used by first time users in an online newspaper environment. This was done by defining the design principles: landmarks, consistency, metaphor, URLs, titles and sitemaps/TOCs through extensive literature studies. An evaluation of each web site followed next, to conclude with which navigational support they contain. Semi-structured interviews were then carried out at each newspaper to find out what changes had taken place since 1996 regarding the service, work and design issues. Finally, a usability test of the three web sites was conducted.

Nielsen (1995) defines usability as one of many components that together make the system acceptable (see figure 1). In this thesis I define usability on the web as a question of making information available for the users, in a way that corresponds to Nielsen's definition by being easy to learn, efficient to use, easy to remember etc. The more help the designer of a web site provides for the users to find the information they need, the more usable it is (Spool, Scanlon, Schroeder, Snyder and DeAngelo, 1999).

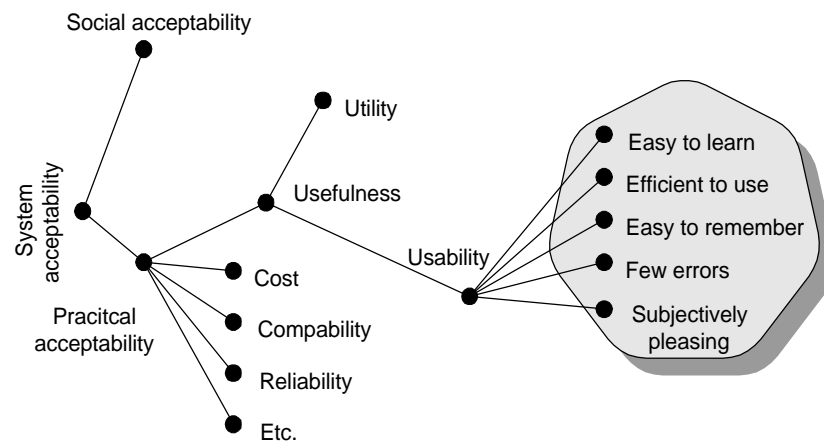


Figure 1 The concept of usability (Nielsen, 1995, p.25)

Van Ostendorp & van Nimwegen (1998) have conducted a usability test of an online newspaper. They focused on the effects of scrolling and using hyperlinks as reading-manipulation techniques on finding information at different locations within the web site. Spool et al. (1999) tested usability regarding text links, whitespace, readability etc. Ödman (1998) chose to test three design principles in an intranet environment.

More testing is necessary in order to establish new theory for web site design. So far the “design principles” are built more on the opinions of researchers than on actual user tests. Ratner, Grose & Forsythe (1996) conducted a study of twenty-one well-known style guides for web design. It appeared that only 20% of the recommendations originate from known results in human-computer interaction research.

I have conducted a usability test to study the possibility for first time users to get an overview of the web sites. That is to say knowing where in the structure they are at a given moment, where to go next and which navigation support they are using in order to do so. The test group consisted of twelve participants.

The framework for this test is based on the principles of coherence and cognitive overhead, introduced in connection with comprehension of hyperdocuments, by Thüring, Hannemann & Haake, 1995 explained in chapter 2. Comprehension is characterised as the construction of a mental model of the nodes and their connections in a web site. Coherence has a positive influence and cognitive overhead has a negative influence on comprehension. Thüring et al. refers to Conklin (1987) who characterised *cognitive overhead* as “the additional effort and concentration necessary to maintain several tasks or trails at one time”. According to Thüring et al. (p.59) orientation cues should be provided to enable users:

- “To identify their current position with respect to the overall structure;
- To reconstruct the way that led to this position; and
- To distinguish among different options for moving on from this position.”

These three statements form the core of the problem definition or research question of this thesis; *how is it possible to reduce cognitive overhead in an online newspaper web site for first time users?*

1.1 Disposition

In the next chapter I will discuss some design principles for good navigational support, which will form the basis for the evaluation of the web sites and the usability testing. The overall methods that I have used in this thesis will be discussed in chapter 3. Chapter 4 contains the results from the interviews and the evaluation of the web sites followed by the usability testing results in chapter 5. I conclude with a discussion in chapter 6 and conclusion in chapter 7. I define the concepts used in this thesis in Appendix A and the interview guide is presented in Appendix B. Appendix C consists of examples of questions used in the usability test. The questionnaire also used in the usability tests is presented in Appendix D.

2. Navigation support

“Navigation is a term that describes activities ranging from the first tentative exploration by an infant to the sophisticated calculations and planning which successfully placed a man on the moon. Navigation in its narrow sense means to move through space; in its broader sense, navigation also includes virtual movement through cognitive space made up of data and the knowledge emerging from those data.”
(Whitaker, 1998, p.63)

There is a difference between the terms browsing and navigating. If a user is actively searching for information, he is navigating. But if a user is moving without a specific goal in mind, he is browsing (McAdams, 1995; Katzeff, 1992; Kindborg, 1991 and Fleming 1999). Thüring et al. (1995) differs between the terms orientation and navigation. The orientation facilities are meant to help the users to find their way while the navigation facilities enable the users to actually make their way. In order to navigate, the user has to find a way to become orientated, to know where in the web site he is.

Hypermedia differs from printed media mainly because it is non-sequential. Ordinary text is sequential in the meaning that there exists a linear sequence that defines the order in which the text should be read. The user reads the first page, then the next and next and so on. Hypertext is non-sequential; i.e. there is no single order in which the text has to be read. Printed newspapers, on the other hand, are not linear in the sense that it is not necessary to read the newspaper from the first page to the last.

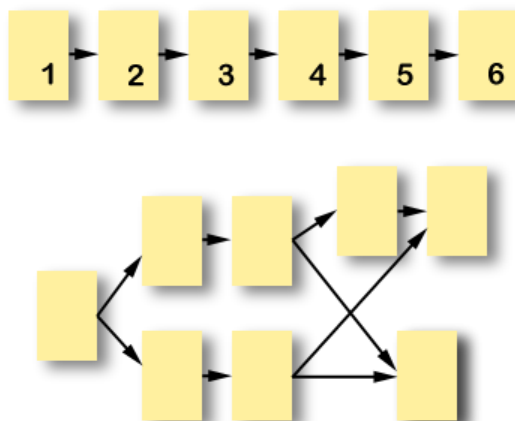


Figure 2 Sequential/ non-sequential

Hypertext gives the user different options to move on. A hyperlink connects two nodes, normally from one position (anchor node) to another (destination node).

It is easy to navigate in a book. You know how much information the book contains, based on its size and number of pages. If you are on page 157 in a book that consists of 300 pages, it is obvious that almost the second half remains. In a hypertext system it is much more difficult to know where you are and estimate the amount of information remaining.

The powerful flexibility of hypermedia with its various structures and link types is an invaluable aid in presenting any material on a web site. But there is a danger that the user can feel disoriented, not knowing exactly where in the web site he currently is or how to get to a specific node of information. He may lose the overall picture of the web site structure.

This problem of getting lost is known as the problem of disorientation (Kindborg, 1991). Kindborg is referring to Conklin (1986) who identifies two major problems: knowing where you are in the hypermedia network, and knowing how to find some other node in the network (and knowing if such a node exists). This problem also referred to as ‘Lost in hyperspace’ is discussed by Edwards & Hardman, 1989; Gay & Mazur, 1991; Shneiderman & Kearsley, 1989 and Nielsen, 1995.

Bernstein (1991), on the other hand, questions if the navigation problem really exists. He argues that the widespread belief that hypertext navigation is difficult appears to rest upon three basic arguments:

- *“Hypertext navigation necessarily confronts readers with a new and unfamiliar cognitive burden, in addition to the customary burdens associated with reading (e.g., [Conklin, 1987].)”*
- *Hypertext readers are observed to issue a large number of navigation commands. [Walker, 1990]*
- *Anecdotes in which individuals found a specific hypertext document to be confusing.” (p.287)*

Each argument is vulnerable according to Bernstein. He argues that the well-known Hawthorne¹ effect casts strong doubt on any estimate of cognitive difficulty. Navigational commands, he argues further, might as well be attributed to displacement behaviour as to an intrinsic property of hypertexts. Regarding the anecdotes of disorientation they can be as easily related to the individual documents, not of the medium itself.

There are several options discussed in order to minimise the “lost in hyperspace” problem, to ease the cognitive burden of the user, i.e. the mental effort spent on the construction of a mental model in order to understand the web sites structure. I have chosen to use the framework of Thüring et al. (1995) regarding coherence and cognitive overhead to discuss different design principles, which form the basis of the evaluation of the web sites and usability test.

2.1 Coherence and cognitive overhead

According to Thüring et al. (1995) there are two factors that are crucial in order to comprehend a hyperdocument; coherence as a positive influence, and cognitive overhead as negative influence on comprehension.

The term coherence is divided into local and global coherence, where local coherence is to understand the “small-scale” connections between clauses and sentences in an amount of information. Global coherence is conclusions drawn from several clauses, sentences, paragraphs or even chapters. To apply this in a web site environment one has to differ between the node level (within nodes) and the net level (between nodes).

To increase global coherence at the net level, authors have to provide cues that help the user to identify the major components in the overall structure and how they are connected to each other. This can be accomplished with a graphical map over the web site.

¹ Original source: Roethlisberger, F., J. & Dickson, J. (1939). *Management and the worker*. Harvard University Press, Cambridge, Massachusetts.

Thüring et al. refers to static structures in this context. The navigation support in online newspapers can be regarded as static meaning their placement and design, while the content is often news-related and constantly changing.

Thüring et al. refers to Conklin (1987) who characterised *cognitive overhead* as “the additional effort and concentration necessary to maintain several tasks or trails at one time”. One way to reduce cognitive overhead is to provide help for the users to construct a mental model of the web site.

There are two aspects of navigation to be considered in order to reduce the users’ efforts to act on their navigational decisions according to Thüring et al.: *direction* and *distance*. Forward and backward navigation is related to the term direction, and steps and jumps are related to the term distance. Forward navigation means when a user is seeking new information in a node he has not yet visited, while backward navigation means when he is looking for information in a node already visited. A step, for example, is when a user follows a link that leads somewhere within the section he is currently visiting. A jump is taken when a user follows a link to a different section within the web site as well as a link that leads outside of the web site.

2.2 Cognitive design issues

Thüring et al. (1995) summarises ten cognitive design issues to support the construction of a mental model.

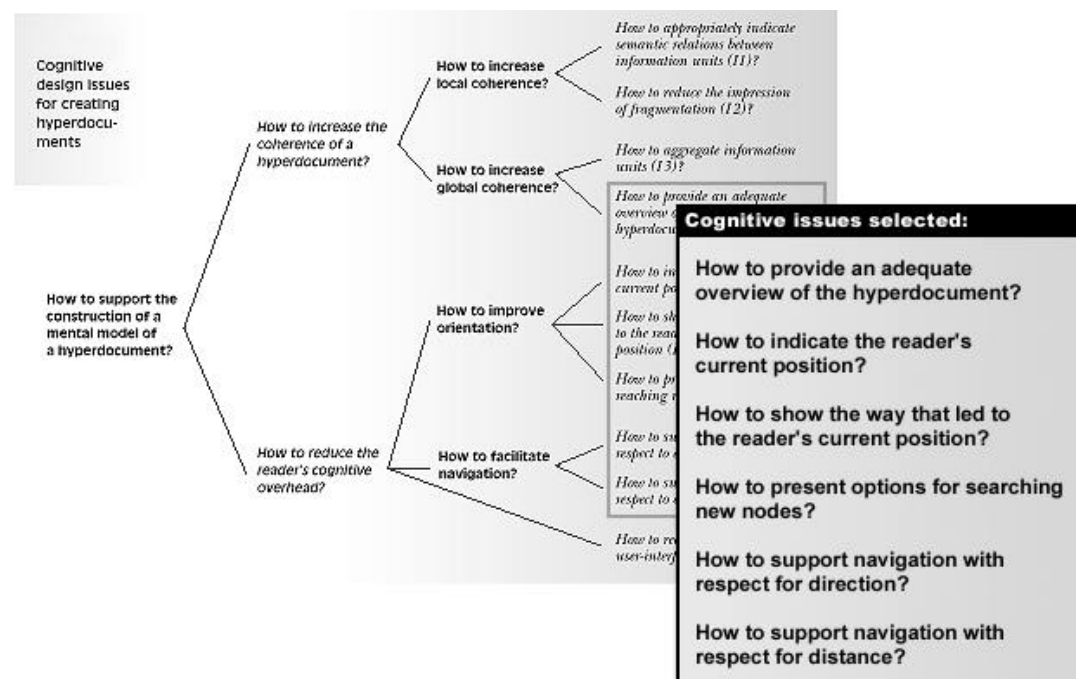


Figure 3 Cognitive design issues for creating hyperdocuments (p.60)

I have chosen to select six cognitive design issues that are relevant for the design of navigation support in a web site environment. In the rest of this chapter I will discuss different approaches (design principles) to tackle the questions posed above. I will also answer these questions in the discussion in chapter 6.

2.3 Design principles

The following design principles form the basis for the evaluation of the web sites and are used to analyse the interviews as well as the usability test. I include the concepts of direction and distance by Thüning et al. (1995), discussed in section 2.1, in the design principles as well to cover the backward navigation and the connection back to the homepage from services provided.

2.3.1 Landmarks

Katzeff (1992) and Thüning et al. (1995) points out that the user should be able to create an overview of the physical structure of the web site by considering the connection of nodes and how they are linked together. Dillon, McKnight and Richardson (1990) describes three stages in how a cognitive map is acquired:

- *Landmark knowledge* – the user starts out by recognising visual landmarks which helps him to understand where in the structure he is at the time (If you see the Eiffeltower, you are in Paris). This knowledge serves as a framework for a cognitive map.
- *Route knowledge* – the user quickly learns how to get from point A to point B but lacks the knowledge of the overall structure (i.e. we can travel from Gothenburg to Stockholm without knowing where all the exit roads lead to). Despite possessing route knowledge a person may still not really know much about the environment.
- *Survey knowledge* – the user has a fully developed cognitive map that helps him to navigate the system. He is able to get to where he wants in the structure and is also able to give directions to somebody else.

The use of landmarks can reduce the cognitive burden of a user. A company logotype can serve as a landmark if used on the same place in all documents of the web site. Typographical cueing, like headings is another example of landmarks (Kindborg, 1991). Thüning et al. (1995) also stresses the importance of understanding the concept of navigation. The use of labels must be clear and understandable.

2.3.2 Consistency

Fleming (1998) points out the importance of consistency in the placement and appearance of the navigational support. The approach to navigation should be consistent; the ability to predict where the navigational support will be found is an important first step in making choices. She suggests that shading out the current position and making it visible but not clickable could serve as a landmark. Nielsen (1998) argues that consistency is the key to usable interaction design.

2.3.3 Metaphor

First selecting, and then following, an applicable metaphor achieves a consistent interface. The metaphor is the overarching theme that captures the form and function of the system's architecture. Metaphors based on ordinary and familiar concepts, e.g., a desktop, book, travel and a stack of cards, have all been used to bring real-world concepts and familiarities to what otherwise might be a confusing new system. According to Lynch (1994), a successful metaphor limits the number and complexity of rules that the user must learn "...because the 'rules' governing the user's interactions ought to be self-evident in the metaphor." (p.30). There is a drawback with metaphors, though, it is possible that they can hamper and limit the users' conceptions of what can be done in the new system (Löwgren, 1993).

2.3.4 URLs and titles

A browser gives the user three kinds of support for navigation, besides the back and forward buttons, bookmarks and lists of history (Kahn, 1995).

1. The title of the document
2. The URL of the document
3. The URL of the destination link (see figure 4)

This kind of information does not give a total mental picture of how the document fits in among the other documents in the web site, but it serves as some of the landmarks necessarily to be able to navigate. In this context I would like to quote Shneiderman, Kreitzberg & Berk (1991, p.152).

"We strongly believe that the use of article titles as navigational landmarks can reduce the disorientation readers of hypertext inevitably feel..."

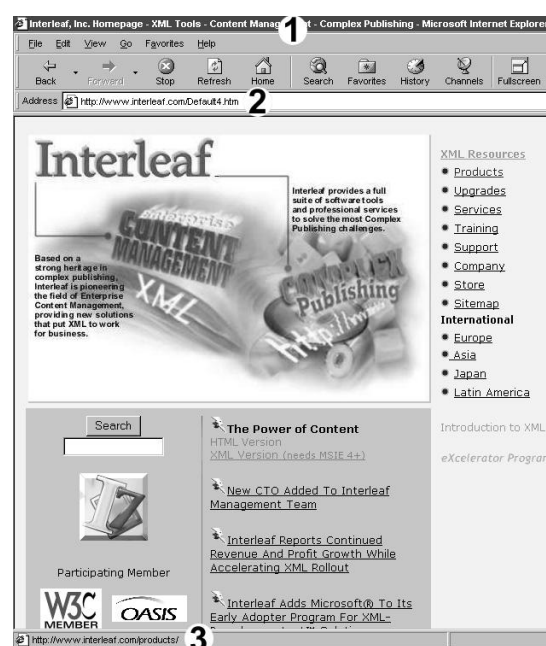


Figure 4 Interleaf Homepage [2]

The document title is used by the search engines on the Internet as the name of the bookmarks we can create to help us to return to the web site. This aspect strengthens the theory of relevant titles.

The importance of the URLs as landmarks is argued by Nielsen [1]. Through his investigations he had found out that users try to decode the URLs of pages in order to understand the structure of the web site. He recommends relevant and short human-readable directory and file names, and to avoid special signs, such as ~, in the URLs, many users fail to type them.

2.3.5 Sitemaps and TOCs

Sitemaps can serve as a solution to the problem of disorientation. A sitemap is a graphical representation of the structure of a web site and can provide an excellent overview as well as quick leaps between structurally distant site areas. Organising a table of contents instead can help the negative aspect of being slow to download. A TOC shows the structure of the web site textually, usually providing a clickable list of categories and subsections (Fleming, 1998; Rosenfeld & Morville, 1998 and Nielsen 1995).

2.4 Summary

The problem referred to as “Lost in hyperspace” concerns the ability for the users to know where in a web site structure they are and knowing where to go next. Thüring et al. (1995) discusses the terms coherence as a positive influence and cognitive overhead as a negative influence in connection to the comprehension of a hyperdocument. One way to reduce cognitive overhead is to provide help for the users to construct a mental model of the web site.

I have chosen to select six cognitive design issues, discussed by Thüring et al., to support the construction of a mental model that are relevant for the design of navigation support in a web site environment. These cognitive design issues are: How to provide an adequate overview of the hyperdocument?; How to indicate the reader’s current position?; How to show the way that led to the reader’s current position?; How to present options for searching new nodes?; How to support navigation with respect for direction? and How to support navigation with respect for distance? I discuss different approaches to tackle these questions. I refer to these approaches as design principles, which are: landmarks, consistency, metaphor, URLs, titles, and sitemaps/TOCs.

These design principles form the basis for the evaluation of the web sites and are used to analyse the interviews as well as the usability test. I include the concepts of direction and distance, introduced by Thüring et al., in the design principles as well to cover the backward navigation and the connection back to the homepage from services provided.

3. Method

I have chosen to use qualitative methods in order to answer the research question *how is it possible to reduce cognitive overhead in an online newspaper web site for first time users?* Using qualitative methods means that the researcher tries to contribute to knowledge through description, interpretation and understanding. The researcher is aware of the fact that the results are influenced by his conceptions. Focus is on validity, on “real”, “rich” and deep data (Easterby-Smith, Thorpe & Lowe, 1991; Dahlbom & Mathiassen, 1995 and Wiedersheim-Paul & Eriksson, 1991). Validity means to what extent we can be sure that a test or instrument measures the attribute that it is supposed to measure (Easterby-Smith et al., 1991).

A multiple-method approach has been used. First of all some design principles regarding “good navigation support” were defined through studies of literature. These principles served as the basis for the evaluation of the web sites that was carried out next. After the evaluation the interviews took place and finally the usability testing was carried out.



Figure 5 The multiple-method approach

3.1 Choice of web sites

The online newspaper sites have strengthened their position as a new genre for distribution of news during the last three years and have a widespread readership who return to the web sites on a regular basis (Eriksen & Ihlström, 1999). As the web sites grow to large-scale information sites it becomes important to provide efficient navigation support for first time users as well as for the users who visit the web sites frequently. It is essential to facilitate for first time users to make them feel comfortable navigating the web site in order to get them to return again and again. The returning users could be challenged with alternative navigation support.

Göteborgs-Posten (www.gp.se), Jyllands-Posten (www.jp.dk) and Dagbladet (www.dagbladet.no) were all early starters on the Internet and their web sites have grown considerably during the last three years. The newspapers are located in three different countries: Sweden, Denmark and Norway. According to Eriksen (1997) the diffusion of Internet has been at a different pace in these three countries, Denmark was lagging behind in 1996 in terms of numbers of users and in terms of experience in organisations with using the Internet. This factor is expected to give a higher variation between the selected organisations.

Choosing the same organisations as Eriksen in 1996 will also give an interesting longitudinal perspective on what has happened regarding the service, work and design issues during the past three years.

3.2 Literature Studies

The purpose of the literature studies was to define a set of design principles that would form the basis for the evaluation and usability test to come. I began to search the Internet and the libraries for relevant references. I used common search engines such as AltaVista and InfoSeek. The terms used were navigation and usability combined with design and web. This was done in order to get a general overview and I found several books that I ordered. After that I focused my search at the ACM digital library, where the accuracy of the articles cannot be questioned. I also found several interesting references in the articles that I read.

I began searching for relevant articles early in the fall of 1998 and this process continued until March 1999. I considered it essential to get an overview of other research in the area of navigation and structure of web sites as well as research of online newspapers. I also tried to find literature regarding usability testing.

3.3 Evaluation

The next step was to make an evaluation of the three web sites. The evaluation was conducted in a way that a few relevant criteria are identified which are then used to evaluate the design of a system.

I have printed out most of the pages of each web site. When there were sections that had the same navigational support, I only printed out one of them. I used a system of colours and numbers to mark up the connections between the pages of the web sites, on the papers I had printed out, as I navigated the pages on the web. I used the design principles described in chapter 2, as criteria and made notes as I found things that supported or contradicted those principles.

This evaluation was made in order to get an overall grasp of the web sites before the interviews were conducted as well as to document the different types of navigational support found on each web site. The results of the evaluation are presented in chapter 4.

3.4 Interviews

The purpose of the interviews was to find out what kind of discussions had been carried out to initialise the present design, and to find out what has happened since 1996 with regard to the service and work.

Because I work at a newspaper I asked my chief to investigate whom I should contact at each newspaper. He presented me with names and e-mail addresses and a first contact was made. Due to the fact that the newspapers are located in three different countries serious planning had to be done. The interviews were all conducted within a two-week period.

At Göteborgs-Posten and Dagbladet two interviews were conducted at each newspaper. Because I wanted to get the longitudinal aspect in this thesis as well, I tried to interview one person who possessed the knowledge of what had changed with regard to the service and work since 1996. The other interview was with a person who is currently involved in the design of the web site. At Jyllands-Posten only one interview took place, since the interviewee possessed knowledge of both aspects.

An interview guide with important questions/themes was used to avoid missing any essential information (Starrin & Renck, 1996). The guide was mainly based on the evaluation results and questions to follow up Eriksen's study of 1996 (see Appendix B). This guide was sent to each newspaper in advance.

The interviews were semi-structured, which means that the researcher tries not to direct the interview too much but to leave space for thoughts of the interviewee. The interview then becomes more like a conversation instead, where the researcher only tries to get the issues of the interview guide answered (Easterby-Smith et al., 1991).

I used a tape recorder at each interview because I wanted to focus on the conversation rather than take notes. The interviews were later all transcribed. Because of the different languages of the interviewees, special attention has been made on getting the transcriptions as correct as possible. I listened to the tapes again and again in order to get it right. But it is possible that some minor differences from the original statements exist, as expressions differ among the Scandinavian countries. After choosing the quotations presented in chapter 4, I contacted an Englishman who works with translations, to translate them correctly for me. He also translated the quotations used to present the result of the usability test in chapter 5 and appendices B-D.

The different design principles discussed in chapter 2 were used as a basis for the analysis as well as the results in Eriksen's study of 1996. The results are presented in chapter 4.

3.5 Usability Test

The purpose of the usability test was to find out if the three newspapers had succeeded in reducing cognitive overhead in their web sites.

I chose to test only the news-related parts of each web site since the web sites differs a lot in terms of services provided. It was also an expressed wish from the interviewees to test those parts since they considered the editorial parts the most important ones. I used the design principles presented in chapter 2 to analysis the test.

"The reliability of usability tests is a problem because of the huge individual differences between test users (Nielsen, 1995, p.166)." On the web one has to expect a diversified group of users. The composition of the test group very much fits the profile of the average user of these web sites and thereby increases the reliability of this test. The profile of the average user was obtained from the newspapers, and it shows a well-educated user between 30 to 40 years. *"Validity is a question of whether the usability test in fact measures something of relevance to usability of real products in real use outside the laboratory (Nielsen, 1995, p.169)."* As usability on the web concerns providing help for the users to find the information needed, measuring how the users are able to recognise this help increase the validity of this test.

3.5.1 The test group

The test group consisted of twelve participants where 50 % were male and 50 % female. The dispersion of ages differed from 23 to 60 (See table 1). None of the users had visited any of the web sites before the test, which makes them first time users of the web sites.

A majority of the test group had conducted university studies (four B.A, one Fil. Lic), three participants were students at the time and four participants had a college degree (at least two years).

The test group had the following professions: one cleaner, one unemployed, three students, two PhD. students and teachers, one secretary, two project leaders, one informant and one manager.

The participants were asked to categorise themselves regarding computer and Internet experience.

The interval was between 1 to 5, where level 1 was low and level 5 was high (See table 2 and 3).

The computer experiences of the group were quite high, where a majority categorised themselves between level 3 and level 5. The Internet experience was evenly spread.

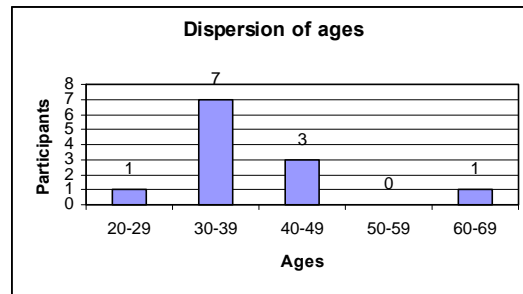


Table 1 Dispersion of ages

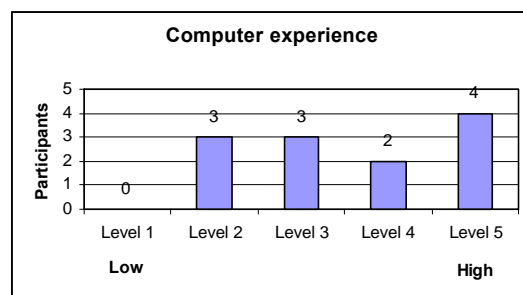


Table 2 Computer experience

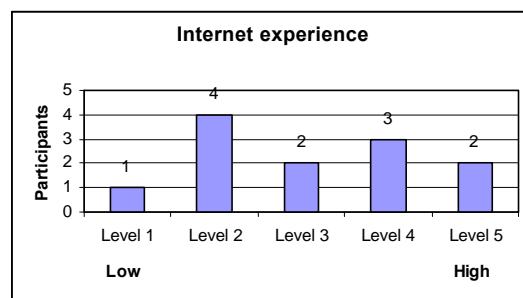


Table 3 Internet experience

Since all participants were Swedish, I translated some of the headlines and words used in the navigation bars and menus of the web sites of Jyllands-Posten and Dagbladet. The questions asked in the tests of these two web sites were carefully chosen in order to avoid misunderstanding due to the different languages.

3.5.2 The test

Netscape or Internet Explorer versions 4 were used for the tests. Each participant spent an hour together with me in front of the computer. Each of the three web sites was tested by four participants of the test group. A tape recorder was used according to the classic usability testing “think aloud” approach, by asking them to tell me what they were doing at all times (Shneiderman, 1997). The main advantage of this approach is that it pinpoints user misconceptions. The disadvantage is that it is unnatural for the users (Nielsen, 1993). In this case I judged it necessary to use this approach in order to come to terms with how the users thought in different situations.

The first 20 minutes the participants were asked to read the online newspaper as they normally read the printed newspaper. This was done to let the participants get a “feel” of the web site and to help them become familiar with the navigation support. I deliberately chose not to be just a silent observer because it was essential for me to find out if the participants knew where in the web sites they were at a specific moment (Shneiderman, 1997). To find this out, I simply asked them if they knew their position a couple of times during the test. I also asked them what they looked at on the screen to find this out.

The test continued with six specific questions on a printed form for the users to answer. The answers where to find somewhere in the news-related parts of the web site and the questions were specific for the day the test was conducted. This involved navigating some levels further down in the hierarchy as well as scrolling. I took notes of the movements and choices they made in order to answer the specific questions.

At the end of the test the participants were asked to fill out a questionnaire with seven questions regarding how they had experienced the web site and the search for information (see Appendix D). The results of the usability testing are presented in chapter 5.

3.6 Alternative method

This study could have been carried out by use of a quantitative method such as questionnaires presented on the web sites for the users to fill out. I chose not to use this method because I found it essential to secure a personal contact with the users in order to discover how they really thought in different situations, which is difficult to accomplish by a questionnaire.

4. The newspapers

The results from the interviews at the three newspapers are presented respectively for each newspaper according to the service, work and the design issues followed by the evaluation of the web sites. I summarise the material grouped according to the design principles, presented in chapter 2, at the end of the chapter.

4.1 Jyllands-Posten

Jyllands-Posten (JP) is the largest newspaper in Denmark and is distributed all over the country. The most essential value for the paper is their journalistic competence and the paper has the largest journalistic staff in Denmark with over 120 correspondents around the world. With the help from a consulting firm, three part-time employees designed the news service on the Internet during the autumn of 1995.

There has been a clearly stated short-term goal of earning money from the service and only a few articles were free for non-registered users (none subscribers) until a major redesign in November 1998. From the beginning one could subscribe to the printed paper or the Internet paper or both. Since the redesign, when all news became free of charge and only the contexts, background information and archive was reserved for registered users JP has doubled its traffic and become the most visited web site of all the newspapers in Denmark, according to webtrends of Fakdis (www.fakdis.dk). For a little addition to the subscription fee, access to the Internet edition “Morgenavisen” and the archive is received.

Service

Global distribution was the rationale for the service in 1996, to reach Danish people living abroad. The most important thing today is to publish updated news.

In conjunction with the redesign of the service, the Internet paper “Internetavisen” was given its own profile and separated from the “mirror” of the printed paper, a section now called “Morgenavisen”. The aim of Internetavisen is “... *to fill the gap between morning paper to morning paper.*”, i.e. publish updated news from 8 a.m. to midnight. Morgenavisen is launched on the Internet at 1 a.m. every day (since it is reserved for the registered users) and is seen as a peripheral product compared to Internetavisen. There is an expressed wish to have the articles in an online searchable archive and the opinion is that one could just as well publish “Morgenavisen” because the work has already been done with categorising the articles. Other facilities are “IT & Computer”, a section with news relating to that particular area with links to “JP Computer Club” and articles regarding computer games, and “Job”, a section with work related advertisements and articles. The archive enables registered users to search for articles from up to three months back. A special subscription is needed for further search.

At JP there exists a clear focus on news. “*We are not tempted just to have a load of chat rooms. We dissociate ourselves from that. That is not our task.*”

There is an on-going process that will transform JP from being a newspaper house to a news house. The Internet service is just one among other electronic services, the most important one right now but still one among others. Another service is to update text TV news for TV3.

INTERNETAVISEN
Jyllands-Posten

Torsdag 13. maj

Job | Abonnement | Arkiv | Morgenavisen | Internetavisen

INTERNETAVISEN

- Forside
- Indland
- Udland
- Erhverv
- Sport
- IT & Computer
- Vejret
- JP GUIDE**
- København

Læs dagens avis

MORGENAVISEN
Jyllands-Posten
Hvis De vil vide mere

EU straffer danske forbehold

Indland: EU's udenrigsministre vedtager i næste uge en ny forretningsorden, som fjerner en lang række rettigheder fra Danmark, når det gælder det retlige samarbejde, ØMU'en og forsvarssamarbejdet. I praksis vil Danmark ikke længere kunne bede om dansk tolkning og oversættelse af dokumenter. [Læs artikel](#)

Sygeplejersker i strejke

Indland: Forhandlingerne om en overenskomst for sygeplejerskerne brød onsdag eftermiddag sammen. Dermed er konflikten på sygeplejeområdet en realitet fra midnat mellem onsdag og torsdag. [Læs artikel](#)

JP-Xtra • Regeringen tager sammenbrud til efterretning
• JP-dokumentation: Her rammer sygepleje-konflikten
• Fakta: Sygeplejerskernes løn



Stor søster Penille og lillesøster Susanne er blevet lidt gladere for mænd. (Foto: Søren Lorenzen)

Georgi-søstrene siger farvel til flinkeskolen

Indland: I euforien efter Aqua er det let at glemme, at Me & My var en dansk sensation, da Dub-I-Dub strøg kloden rundt i løbet af 1995 og 1996. Nu er Georgi-søstrene tilbage med en ny plade - denne gang lidt gladere for mænd. [Læs artikel](#)

JP Afstemning

Hvis der var folketingsvalg i dag, hvilket parti ville De så stemme på?

- ☐ Socialdemokratiet
- ☐ Radikale Venstre
- ☐ Konservative Folkeparti
- ☐ Centrum-Demokraterne
- ☐ Socialistisk Folkeparti
- ☐ Dansk Folkeparti
- ☐ Kristeligt Folkeparti
- ☐ Venstre
- ☐ Fremskridtspartiet
- ☐ Enhedslisten
- ☐ Øvrige Partier
- ☐ Stemmer ikke/blankt

Stem

Milosevic erkender jugoslaviske tab

Udland: Jugoslaviens præsident, Slobodan Milosevic, erkendte i en tv-tale onsdag, at de jugoslaviske styrker i Kosovo har lidt store tab, oplyste serbisk tv. [Læs artikel](#)

SENESTE NYHED

[Grækenland afvise at lade NATO benytte lufttårn \(03:05\)](#)

[Milosevic erkender jugoslaviske tab \(03:05\)](#)

[Kosovo-diplomati i baglås \(03:00\)](#)

[Britiske efterretningsagenter i fare efter Internet-rapport \(03:00\)](#)

[Carlo Azeglio Ciampi næsten sikker som italiensk præsident \(03:00\)](#)

[Truslen om rigset mod Jeltsin \(03:00\)](#)

[Badminton: Danmark klar til VM-semifinale \(03:00\)](#)

[Stor debat i lagting om færøsk-britisk grænseaftale \(02:20\)](#)

[Pokalfinaler 1995 - 1999 \(01:00\)](#)

[Massefyrringer ryster TV 2 \(01:00\)](#)

[Portræt: Jeltsins tro soldat \(01:00\)](#)

[PKK-kommandant vidner i retssag mod PKK-leder Ouml;calan \(01:00\)](#)

[Israel: Valg mellem to eliter \(01:00\)](#)

[Jeltsin til modangreb \(01:00\)](#)

[United i front efter 0-0 \(01:00\)](#)

[DK kræver Milosevic stillet for krigsforbrynderdomstol \(22:29\)](#)

[Ventelister vil vokse \(22:29\)](#)

[Betalingsbalancen overrasker \(22:29\)](#)

[Flere sprækker i den fælles vestlige front \(22:29\)](#)

Figure 6 www.jp.dk (1999-05-13)

Work

The division of electronic media consists of the Editor, with responsibility for development in general, a special project co-ordinator who handles the practical issues, a salesperson, four journalists and several part-time assistants (all students of journalism who together make up three full-time places). From 8 a.m. to midnight one person serves as news watch and is responsible for the news updates. In order to secure a constant update of news there is close collaboration between the division of electronic media and the Chief Editors of the printed paper.

Journalists from other divisions of the paper sometimes write specially for the web and there are frequent references from the printed paper to Internetavisen for further reading. There is a desire to be first with the news irrespective of which media it is. The strategy is that if competitors are likely to get their hands on the story, then publish it as fast as possible on the Internet. But if the scoop is likely to be exclusive it will be published in the printed paper before it is published on the Internet. The two media are seen as being complementary to each other, where the printed paper is the most important media and will continue to be so.

To get an idea of the growth and diversification that has taken place since 1996, I present some comparable facts.

Jyllands-Posten:	1996	1999
Age of service when studied	3 months	3 years and 2 months
Estimated accesses a day	4,000 people/day	27,000 people/day
Staff	3 part-time employees	7 full-time employees and 3 full-time places manned by part-time staff
Main digital product	Electronic copies of articles from printed newspaper	Updated news from 8 a.m. to midnight as well as an electronic copy of the newspaper
Work	Development and duplication	Updating and duplication
Rationale for design of service	Distribution to people not having access to printed edition	To publish updated news

Figure 7 Characteristics of the Jyllands-Posten service (Eriksen & Ihlström, 1999, p.12)

Design issues

During the redesign in 1998, efforts were made to make the web site more logically structured than before. The layout changed to more text and less graphics, which resulted in a much faster web site. The printed paper has always served as a metaphor, and the aim has been to keep the design pure and fast. The design is referred to as “*very conservative*”, and has received a lot of positive feedback.

A usability test among the journalists in-house was conducted. The reasons for testing the new design on the journalists were; “*Most of them do not have much experience of the Internet so it is good to test it out on them. They are basically very critical, which is one of those prominent qualities among journalists. There we get a lot of sharp criticism, which as it turns out is a useful tool to have.*”

This test led to a few changes in the design. “*Our attention was drawn very much by the small texts, which words one attach round and about. This is actually very*

important. There is actually a tendency in the design to focus too much on the graphics, even more than whether it looks good or not. This is very risky. It should look good of course, but the most important thing is that it appears logical."

The journalists connected to the Internet division started to get the structure of the web site on paper and into plain HTML before the designers were called upon. *"Because there is always a danger of it becoming too design fixated, and our philosophy is that it should be driven by the content. One should build up a structure and layout to suit the required content. And before one can get a site to function on paper or on a HTML page without any design whatsoever, we build up a text and place the things structurally. And when the fundamental things are in place it is then the turn of the designer. We have good experience of this."*

To facilitate for the users different link colours are used to show if the link is reserved for the registered users or not. Red links indicate that a password and user ID is required and green links show that the information is available for everyone to read.

Consistency is considered being of importance, *"We are very aware that things should agree. Like, for instance, when you click on a link here, where it says inland, it should also say inland on the page you arrive at."*

A discussion was held as to whether or not to provide a list that showed the navigational choices as one clicked down the hierarchy, a Yahoo-principle. But another approach was taken that shows the user's position with an arrow in the navigation menu. *"... we reached the conclusion that it fulfilled exactly the same objective."*

The URL's are generated by the database and cannot be altered by hand. They appear as cryptic numbers for the users but have an important function with regard the content. *"...but the most important thing is the title. And the title of the page is even more important. I don't think there are many who look at that title (document title) here."*

There exist no sitemap or TOC on the JP web site. *"We think this one is so easy in its structure. And there is also a resource priority here. We don't want to put out a map like this. It has to be maintained and updated."*

Colours are used to differentiate the sections of the web site. Morgenavisen and the job section have a totally different colour scheme than Internetavisen.

Evaluation

Three different navigation alternatives are presented: the top navigation bar which presents the different sections of the web site (figure 8), the left navigation menu which presents the different subsections within each section (figure 9) and a text menu at the bottom of each page. The text navigation menu consists of the alternatives; Job, Arkiv, Abonnent, Media-info and Mediarium.



Figure 8 Top navigation bar

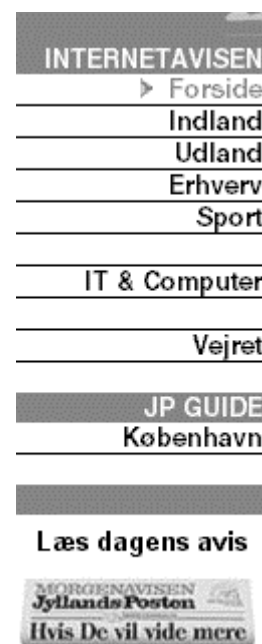


Figure 9 Left navigation menu

Landmarks and consistency

The Internetavisen logotype is presented in the upper left corner of the top navigation bar, in all sections except the Morgenavisen-section. The section title (Job, Arkiv, Abonnent, Morgenavisen and Internetavisen) is presented at the top of the left navigation menu.

The left navigation menu differs depending on which section you are visiting. When selecting a subsection, the menu alternative is made visible but not clickable, to indicate the current position. An arrow indicates which subsection (Forside, Indland, Udland, Erhverv etc.) you are presently visiting, and the menu alternative also changes colour when selected. After clicking on a link of one of the articles, the arrow is presented together with the phrase “artikel” to indicate which subsection the article is categorised to (see figure 10).



Figure 10 Arrow

The left navigation menu also changes depending on which subsection you are visiting at the time. More alternatives are offered at, for example, the Erhverv-section (business and finance-section).

Different link colours are used to indicate which content that is free of charge and which is reserved for the registered users. Green indicates that the information is for free and red that a password and a user ID are required.

The Job section and Morgenavisen have different colour schemes, but Abonnent and Arkiv have the same as Internetavisen.

The web site is consistent in the placement of the landmarks.

Metaphor

The newspaper metaphor is used for labelling the subsections in the left navigation menu: forside (front page), indland (domestic news), udland (foreign news), ehrverv (business and finance) and sport.

Examples of URLs and titles

<http://www.jp.dk/cgi-bin/dbpublish.dll?page=internetavisen/forside>
<http://www.jpguide.dk/cgi-bin/dbpublish.dll?page=kbh/forside>

An example of the document titles is “Internetavisen Jyllands-Posten – IT & Computer”, this is consistent throughout the whole web site. There exists no page titles.

Direction and distance

The menu alternative “Forside” is available within the Internetavisen-section for backward navigation. In the other sections an alternative is presented in the top navigation bar for returning to Internetavisen. JP Guide, a service found in the left navigation menu, and Mediarium found in the text menu have a totally different design than Internetavsiens. It is possible, however, to return to the homepage of Internetavisen from all of these services.

4.2 Göteborgs-Posten

Göteborgs-Posten (GP) is a regional newspaper covering the city of Gothenburg and its local region. GP has a circulation of 270,000 copies a day and the journalistic strength of the paper lies in its extensive coverage of local events and sports. GP was launched on the Internet in August 1995 in connection with Gothenburg hosting the World Athletics Championships. In November 1995 GP started to provide updated news on the Internet throughout the day.

Service

Experiment with the technology was the rationale for the service in 1996. In 1999 the purpose of the service still is to experiment with technology, as well as to be ahead of evolution and find a way for the printed paper to become a fast media. The aim today is to publish news faster than the printed paper. A printed “vision” exists which promotes www.gp.se as the first choice on the Internet for the citizens of Gothenburg, in the sense that www.gp.se is in the forefront of news in the local area and the leading forum for debate.

As regards charging the users for the services, it is not feasible as long as there are other online sites that provide news for free. But there is an ongoing discussion about how to make money out of the services.

Since 1996 the product has diversified with additional services such as travel, employment and property ads, and a number of sections for young people with chat, graffiti and so on. The fact databases, CD and film reviews, which were available as early as in 1996, are still maintained and updated. In-house journalists occasionally report on sporadic news, especially for the web. The Internet paper is saved and is available to the users for one month.

Work

Five people are working full-time with the Internet service and a promise has been made that a sixth employee will be taken on in the near future. The people involved have been organised as a project group named New Media. Because of budget, salary and organisational differences the group have been kept separate from the rest of the newspaper, but since January 1st 1999 they are an editorial division among the others. This is regarded as a great success due to them having fought for it for a long time.

It has been a struggle getting the management of the printed paper to understand the importance of publishing a scoop on the Internet before it is printed in the newspaper. A specific incident took place that made this very clear. As Göteborgs-Posten is a local paper it is obliged to report its scoops to TT, the Swedish news agency, within 30 minutes of it being published. Since Göteborgs-Posten is a morning paper, the scoop was not allowed to be published on the Internet until 9 a.m. when the daily update started. The point is that Aftonbladet, another Swedish newspaper, got the scoop from TT and published it on the Internet six hours before Göteborgs-Posten. This special event led to some changes and today it is possible to publish a scoop on the Internet first.

■ Nya Zeeland gläds åt att bli först in i 2000-talet. Ett uttryck för glädjen är en millenniekextävling. Vinnaren får sitt namn på paketet. Kexen börjar tillverkas vid midnatt den 31 december 1999.



www.stcab.se



Göteborgs-Posten

www.gp.se

Nyheter

Göteborg
Det händer i dag
Inrikes
Utrikes
Sport
Seriespel
Resultat
Ekonomi
Politik
Kultur
Ledare
Debatt

Fondstar

Lokaltidningar

Guider

Filmguiden
Skivguiden
CD Romguiden

Attityd
Graffiti
Chat

Navigera

Sök
Sök nyheter
Multisök
Vägvisaren
Textlänkar
Hjälp

Information

Arkiv
Mediearkivet
GP Bilder
Nyhetsarkivet
Om GP
Kontakta GP

Special

Faktabanker
Nätvykortet
Spelbagateller
IT

Annonsera | Service | Bostad | Resor | Arbetsplatsen | Köp & Sälj | Nyheter

Uppdaterad: 14.52

Fredagen den 14 maj 1999

Uppgifter om civila offer i Natobomning

Serbiska källor uppger att minst 50 dödade

INRIKES: Nytt mp-språkrör utsett

GÖTEBORG: Energibolag nekar kredit

EKONOMI: Skattesmäll hotar Saab



Bild: SOFIA SABEL

Inte bakom flötet

Vallgravsmetet är upptakten till fiskesäsongen för 16-åriga Christoffer Härsjö.

GÖTEBORG: Experiment på råttor stoppas

INRIKES: Toppnotering för kd i barometer

INRIKES: ...men inför EU-valet är m störst

UTRIKES: Elnätet utslaget i Belgrad

GÖTEBORG: Allt fler hoppar av gymnasiet

SPORT: Hård: Ifrågasätt arrangemanget

POLITIK: Svår balansgång nära makten

EKONOMI: Småföretagare klagar mindre

KULTUR: Skräckkabinett som konst

- EU-valet 1999
- GP:s specialsidor om kriget i Jugoslavien
- Allt om fonder: GP Fondstar
- GP:s miljöspecial 1999
- Världens gång

VÄDER



Mulet och tidvis regn. Kyligt med blötsnö inåt land. 4 - 7°.

RÖRLIG BILD

STILLBILD

Endast resultat

VECKANS FRÅGA

Kommer du att rösta i EU-valet?

Sök på www.gp.se

Nyheter

Sök

centralen.gp.se
din guide i Göteborg

KROG & KAFE / VÄDER
KULTUR & NOJEN / LÄNKAR

Service

- ▶ LÄSVÄRDET
- ▶ PRENUMERATIONER
- ▶ SÖK ANNONSER
- ▶ ANNONSERA
- ▶ MED MERA

GP GOLFEN - STARTTIDER
Kvaldag: Onsdag 19 maj

GP Bostad



Sveriges största
BOSTADSDATABAS

Arbetsplatsen



SÖK JOBB:
• I västsverige
• I hela riket
• I hela världen

GP Resor



RESTRESOR

- ▶ PRENUMERATIONER
- Prenumerera
- Adressändring
- Utebliven tidning
- Läsvärdet

▶ SÖK ANNONSER

Figure 11 www.gp.se (1999-05-14)

To get an idea of the growth and diversification that has taken place since 1996, I present some comparable facts.

Göteborgs-Posten:		
	1996	1999
Age of service when studied	7 months	3 years 7 months
Estimated accesses a day	3,000 people/day	27,000 people/day
Staff	3 part-time employees, 2 full-time	5 full-time employees
Main digital product	Electronic copy of selected articles from printed newspaper and web-tailored article bases	Updated news, electronic copy of selected articles from printed newspaper and web-tailored article bases, several marketing services
Work	Development, maintenance and duplication	Updating, development, maintenance and duplication
Rationale for design	Experiment with the technology	Be ahead of evolution, find a way for the printed paper to become a fast media and experiment with the technology

Figure 12 Characteristics of the Göteborgs-Posten service (Eriksen & Ihlström, 1999, p.8)

Design issues

The web site does have some inconsistencies but these are due to redesigning and lack of time for maintenance of the “old” services. A special list has been compiled of things to be done now, things to be done soon and things that can be done sometime in the future. The latest redesign involved the removal of java-scripts and frames with the homepage being kept “cleaner” in order to speed up the access. *“It took two minutes at the worst to download a page, and that is absolutely not acceptable.”*

The latest design was done by one of the journalist working at the Internet division. He presented prototypes resulting from brainstorming sessions with the other four members of the division. Criticism was expressed, followed by a new prototype and so on. *“It is a constructive way to work.”*

A usability test was conducted in connection with the latest design. They were looking for people with different computer experiences and of different ages for the test. Ten persons were invited to participate. A list was organised with questions for the participants to answer. And then they observed the participants as they were carrying out the tests. *“It was extremely rewarding and it was rewarding in many surprising ways. You realise there're people who don't click on logos and such like.”*

The test resulted in considerable redesign. *“Because, no matter how smart you think you are, how simple you think you do it, you have one anyway, if you work on the web and have done it every day for several years. It speaks for itself that it can't be compared to Mum, 55 years old.”*

The idea of the structure in the latest design is a “smörgåsbord”, where one can reach everywhere from the homepage within two clicks. *“But you also have a navigation that goes deeper and a navigation that goes straight across. So we change the left column depending on where you end up. Before it was always the same left column.”*

The aim is that the GP logotype be presented in the upper left corner together with a subtitle of the section. At the moment some of the older sub sites are lagging behind, but the intentions are to get the web site consistent in this matter. *“...straight away as soon as you click you should know where you are. And you should also know how to get somewhere else.”*

In the latest changes of the design, colours have been used to differentiate the sections. *“We are working a great deal with that too (colours), what one has to do is to find a language of form especially for the web.”*

There exist a sitemap at the GP web site but it is rather difficult to find. *“...we're busy on a new one. We have so much information, we have all the main tracks on the homepage. So that you shouldn't actually need it. At the same time it feels secure or whatever. It's still that way that people look it up and use it. It fills some sort of function all the same.”* GP also provide a kind of TOC presented as text alternatives of the web services in alphabetical order, which is available from the left navigation menu.

Evaluation

Three different navigation alternatives are presented: the left navigation menu which presents most of the different sections of the web site in blue (see figure 13), the top navigation bar which also presents some different sections (see figure 14) and a menu to the right of the homepage that belongs to the Advertising Department. The design has changed somewhat in some parts of the web site during the time spent writing this thesis.

Annonsera | Service | Bostad | Resor | Arbetsplatsen | Köp & Sälj | Nyheter

Figure 14 Top navigation bar

Landmarks and consistency

The left navigation menu changes depending on which section you are visiting at the time. More alternatives are presented in connection with the present section alternative while other menu alternatives are not presented at all in this context.

In the subsections connected to the news section, a local navigation system within the subsection is available (see figure 15). In this system the text links to the left serve as anchors within the page and the text links to the right lead to more pages within the subsection.

Ekonomi 19/4
[Volvo PV pressar leverantörer](#)
[Nytt företagarliv i ny världsdel](#)
[Individuella hyresavtal kan ge billigare boende](#)
[Marknaden experimenterar](#)

Ekonomi innehåller
 3 sidor.
 Du är på sidan 1.

Sidan 1
[Sidan 2](#)
[Sidan 3 - Senaste nytt](#)

[Till första nyhetssidan](#)

Figure 15 Local navigation system

Nyheter
 Göteborg
 Det händer i dag
 Inrikes
 Utrikes
 Sport
 Seriespel
 Resultat
 Ekonomi
 Politik
 Kultur
 Ledare
 Debatt

Fondstar

Lokaltidningar

Guider
 Filmguiden
 Skivguiden
 CD Romguiden

Attityd
 Graffiti
 Chat

Navigera
 Sök
 Sök nyheter
 Multisök
 Vägvisaren
 Textlänkar
 Hjälp

Information
 Arkiv
 Mediearkivet
 GP Bilder
 Nyhetsarkivet
 Om GP
 Kontakta GP

Special
 Faktabanker
 Nätvykortet
 Spelbagateller
 IT

Figure 13 Left navigation menu

The aim is to present the GP logotype in the upper left corner together with the section title on all pages, but there exists some inconsistency, especially in the subsections connected to the guides section.

Different colour schemes are used in the original design as well as in totally different designs appearing in many of the “older” subsections.

Metaphor

The newspaper metaphor is used to label the alternatives of the news section: inrikes (domestic news), utrikes (foreign news), ekonomi (economy), politik (politics), sport and so on. The newspaper metaphor is also used in the local navigation system within the news section (see figure 15), where the labelling “Sidan 1” (Page 1), “Sidan 2” etc. is used.

Examples of URLs and titles

www.gp.se/platsannonser

www.bostad.gp.se/

dags.gp.se/dags/forms/rub_list.html

The document titles differ in the web site. The pages connected to the top navigation bar have a system like this: GP Kundeservice, GP Resor, GP Arbetsplatsen and so on. But there exists inconsistency in the titles as well, for example several of the subsections connected to the guides section have the title: www.gp.se-Nyheter. The section titles are shown together with the logotype and different systems are used for the page titles.

Direction and distance

The logotype should serve as a link back to the homepage, but at several subsections such a connection is missing. GP provides several links that lead out of the service where links back to the homepage are not available.

4.3 Dagbladet

Dagbladet is published in Oslo, the Norwegian capital and is the third largest paper in Norway with an average circulation of 206,000. It is a tabloid paper, with very few subscribers but with many copies sold over counters in kiosks, cafés and shops. It is in intense competition with two other newspapers, Verdens Gang - VG, which is the largest paper in Norway with a circulation of 364,000, and Aftenposten (a morning paper with a circulation of 288,000).

The service was launched on the Internet in March 1995 motivated by the paper's slogan "Alltid foran" (always first) making it the first such service in Norway.

Service

The purpose of the service in 1996 was to advertise for the printed newspaper. The aim for 1999 is to become one of the five largest net cities in Norway. In order to accomplish this they are developing both the editorial and commercial sections, purpose being to both broaden and deepen the product. The classic "Net-avis", in competition with other online papers, is trying to broaden while at the same time deepen its product by focusing on literature and music. They want their users to think of them as being updated and experimental. Charging money from the users is not considered an option; too many other newspapers are on the market offering free services similar to that of Dagbladet.

The interface, which had been redesigned several times, was complex and difficult to overview in 1996, making it a challenge for the user. It was not possible to get an overview of the service and its content from the pages. The service had turned into an entertainment mall, where the user through interaction could spend time with or without any specific purpose.

Competition has toughened during the years and "Dagbladet :på nettet" is now trying to find its own niche. At present there are two major ongoing projects, literature and music, with the emphasis on depth. In the literature section, for example, it is possible to review a book then buy it. These projects are connected to the culture section and have as much traffic as the news section.

It is now considered essential to publish updated news for the users and to provide contexts where the news is put in perspective. There is also a wish to transform Dagbladet from a newshouse to a mediahouse.

Work

26 people are at present involved in the production. The Daily Editor and News Leader are responsible for the editorial, commercial and technological side of things. The editorial staff consists of a news chief, an editor-in-chief, a watch chief, four journalists and nine assistants. The rest of the staff consists of a development chief with three employees and a sales manager with two salespersons and some consultants.

The journalists at the division write some material exclusively for "Dagbladet :på nettet", usually for the culture section but also on news related subjects.



:på nettet

Jan Kjørstad
:på nettet
Les svarene!

:nyheter **:på din side** **:kultur** **:sport** **:torget** **:oppdatert**



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www.jobshop.no



Haugen Bok



bilguiden
ja

Vinn cruise!

I NYHETSBIDET

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NYHETER

DAGBOK FRA BEOGRAD



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SPORT

VM-guiden
:på nettet

[:fotball](#)
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[:engelsk liga](#)
[:mitt drømmelag](#)
[:håndball](#)
[:ski](#)

KULTUR

[:film](#)

Riksrettssaken startet i dag:



Kan bli avsatt

Boris Jeltsins dager som russisk president kan være talte. I dag tidlig startet riksrettssaken mot ham. Prosessen kan føre til at Jeltsin blir avsatt.

[:hele saken](#) [nyheter](#)

SISTE 5 13.5 9.44

[250 soldater forlater Kosovo](#)
[09.20 :nyheter]
[Bankstreik i vente](#)
[09.18 :nyheter]
[Kan bli avsatt](#)
[09.17 :nyheter]
[Riksrettssaken mot Jeltsin åpnet](#)
[08.32 :nyheter]
[Kan bli nærsynt av soveromslus](#)
[07.57 :pds]
[:hele nyhetsdøgnet](#)



Er det bare iskremselgere som slipper billig unna i sommer?



Vil dopteste skoleelever

SV vil dopteste ungdomsskoleelever. Elevene skal avlegge urinprøver for å kontrollere om de er narkotika-misbrukere. Elever Dagbladet :på nettet har snakket med synes det er en god idé.

[:hele saken](#) [nyheter](#)

Vil forsikre penis

En norsk pornoskuespiller ønsker å forsikre sine edleste deler. Mannen begrunner det med at arbeidsredskapet er under konstant press.

[:hele saken](#) [nyheter](#)

- Rosenberg hadde flaks



Drillo mener 0-5-seieren til Rosenberg i går var kombinert med flaks. - Rosenberg er dyktigst i Norge i overtall, men når de scorer fem ganger på ni sjanser har de også flaks, sier Drillo

[:hele saken](#) [sport](#)

Mann alvorlig skadd i brann

En mann ble alvorlig skadd og 40 beboere måtte



Sjokkert Farrow

Mia Farrow er sjokkert over at Woody Allen (63) har fått barn med adoptivdatteren Soon Yi-Previn (28).

[:hele saken](#) [kultur](#)



Gravid og vakker

Supermodell Cindy Crawford viser at

Figure 16 www.dagbladet.no (1999-05-13)

To get an idea of the growth and diversification that has taken place since 1996, I present some comparable facts.

Dagbladet:	1996	1999
Age of service when studied	1 year	4 years
Estimated accesses a day	5,000 people/day	28,000 people/day
Staff	4 part-time employees, 3 full-time	9 part-time employees, 15 full-time and some consultants
Main digital product	Electronic copies of a few articles from printed newspaper and games, discussions & reviews	Electronic copy of articles from printed paper, updated news, profound literature and music sections, reviews, games & discussions
Work	Development, maintenance and duplication	Updating, development, maintenance and duplication
Rationale for design	Advertise the printed edition	Becoming one of the 5 largest net cities in Norway

Figure 17 Characteristics of the Dagbladet service (Eriksen & Ihlström, 1999, p.5)

Design issues

A bureau was involved in the redesign in autumn of 1996 and the concept is still pretty much the same, with a lot of in-house technological development. *“We went from an elaborate design to a minimal design. The idea was that only the editorial would be heavy. We should not only be the reader's best friend but it should also be as effective and clear as possible. We were the first newspaper to strip down the design and after that all the others have followed. It actually means something to people that things go quickly.”*

A lot of thought has been put into the structure of the web site. *“The saying ‘the reader's best friend’ is quite important to me. We also have a similar catchword that says “read more, click less”. That is something we are very consistent with, that you should always find your way straight to the item.”*

It has been crucial not to *“...maximise the traffic but maximise the user-friendliness.”*. There are three ways of getting to the information needed. The first is the classical sections with news, culture and sport produced by journalists. The second is by the “Opdatert” section, which provides the latest news in chronological order. The third is by thematic use.

No usability test has been done, but *“We have had a focus group, that is to say we want to see the target effect through our own advanced statistics. We look at what works and at what doesn't work and then we change it.”*

The documents titles are generated by the database and are consistent regarding the content of the web site. *“The title comes automatically, everything is automatic, it comes from the title on the article.”*

There are two different systems for naming the URLs. “One has a URL after section with title and date, plus an article number. This is a unique identification number in the database. And then we have something we call “contexts”, collection pages of articles. We then use the context, plus slash plus identifier from the database.”

There exists no sitemap at Dagbladet and as long as the users are not asking for one, it is not considered of importance. “As we are thinking, we are building a service in three dimensions linked together and available from the first page, so it is up to the user to choose. This train of thought does not eliminate a sitemap, but we don't put any emphasise on that type of navigation and we don't receive any enquires about it from the readers either.”

Evaluation

Three different navigation alternatives are presented: the top navigation bar which presents the different sections of the web site (figure 18), the left navigation menu which presents the sections together with some subsections (figure 19) and a text navigation menu at the bottom of each page. The bottom text navigation menu consists of the same alternatives as the top navigation bar.



Figure 18 Top navigation bar

Landmarks and consistency

The left navigation menu is very long and scrolling is necessary in order to view all the alternatives. The links also serve as a “preview” of some of the subsections found in the main sections: news, på din side, kultur, sport and torget.

The top navigation bar consists of the main sections of the web site. The design of the bar alters between the sections (see figure 20).

The top navigation bar serves as the section title as well and if you have moved further down in the hierarchy, for example to the “krim” a subsection within the news section, it shows in the navigation bar as well as a kind of “threading”. This system is used all through the web site, although the design differs somewhat among the sections (see figure 20).



Figure 20 The news section



Figure 19 Left navigation menu

The main sections are designed with the same concept but with different colour schemes. The web site is consistent in the placement of the landmarks.

Metaphor

The newspaper metaphor is used to label the subsections: nyheter (news), på din side (on your side), kultur (culture) and sport.

Examples of URLs and titles

www.dagbladet.no/nyheter/1999/02/25/158900.html

www.dagbladet.no/kontekst/5487.html

The document titles are organised according to the principle: Dagbladet :news, Dagbladet :film, Dagbladet :snack and so on. This system is consistent all through the web site. Section titles are shown in the top navigation bar.

Direction and distance

The red label marked “Dagbladet” in the top navigation bar serves as a link back to the homepage. Dagbladet offers some services, like a guide to Oslo and a connection with an online bookstore, when the destinations of the links lead out of the Dagbladet web site. At these services a link back to the Dagbladet homepage can be found. The Advertising Department has its own section that differs from the rest of the design, but connection back to the homepage is available.

4.4 Summary

In the table below I summarise the results, in brief, from the interviews and the evaluations grouped according to the design principles presented in chapter 2.

	Jyllands-Posten	Göteborgs-Posten	Dagbladet
Landmarks	Logotype in navigation bar. An arrow in the navigation menu to indicate position in the hierarchy. Section titles in navigation menu. Colour changes in the menu to indicate selected section. Different colour schemes in different services.	Logotype together with the section heading. Page headlines indicating subsections, although somewhat inconsistent. Different colour schemes in different services.	Logotype together with section title. A system for indicating where you are in the structure exists in connection with the top navigation bar. The system differs somewhat regarding the presentation. Different colour schemes in different sections.
Consistency	Consistent in the placement of navigation support and landmarks and with the naming of document titles.	Consistent in the “newer parts” of the web site according to the placement of navigation support and landmarks, naming of document titles and URLs. A lot of inconsistency in the “older parts”.	Consistent in the placement of navigation support and landmarks, with the naming of document titles and URLs. Some inconsistency regarding the presentation of page titles.
Metaphor	Newspaper metaphor used when labelling the left navigation menu.	Newspaper metaphor used when labelling the news section in top of the left navigation menu and within the local navigation system in the news section.	Newspaper metaphor used when labelling the top navigation bar.
URLs	Generated from the database. Cryptic for the users but fills a function for the content.	A system for naming the URLs exists and is consistent in the “new parts” of the web site.	Generated from the database after two different systems.
Titles	Consistent throughout the whole web site.	The pages connected to the top navigation bar have a consistent system for labelling the titles but there exists inconsistency in several of the subsections.	Consistent throughout the whole web site.
Sitemap & TOC	No – does not want to have either of them.	Yes – a new sitemap is under construction. A TOC is also available.	No – not considered of importance as long as the users do not require any.
Direction & distance	Possible to return to the homepage from all services within the web site by logotype or menu alternative.	The logotype should serve as a link back to the homepage, but at several subsections such a connection is missing.	Logotype used as a link back to the homepage, even in the Dagbladet services that are situated outside the web site.

5. The usability test

The purpose of the usability test was to find out if the three newspapers had succeeded in reducing cognitive overhead in the news-related parts of their web sites.

First the participants spent some time browsing to familiarise themselves with the web site. Then they got six questions each to answer by searching the web site. The questions were news related and specific for the day of the test. After browsing each web site, I came up with questions related to the content of the site. I tried not to make the questions too obvious (such as having the answer right on the homepage), so the user would have to navigate the web site. On the other hand, I did not want the questions to be so difficult that the user would give up (see Appendix C for examples). I have summarised the amount of clicks used by the participants in order to answer the questions, posed in a diagram (see table 4, 6 and 8). These diagrams indicate how fast the participants connected the questions to the right section of the web sites. I present the results respectively for each newspaper.

I also present what I have observed during the whole tests according to whether or not the participants knew their position in the web site structure at a given moment, and the difficulties they experienced during the test. I asked the participants of their position both in the first and second part of the test. I also summarise some of the results from the questionnaire that the participants filled out at the end of the tests (see table 5, 7 and 9). The questionnaire is presented in full in Appendix D. I summarise the material grouped according to the design principles, presented in chapter 2, at the end of the chapter.

5.1 Jyllands-Posten

To answer the questions a lot of scrolling was necessary. Some of the participants glanced at the page headlines first while others went straight ahead to the “latest news” section available at each page in the news section. Most of the questions were answered within two clicks.

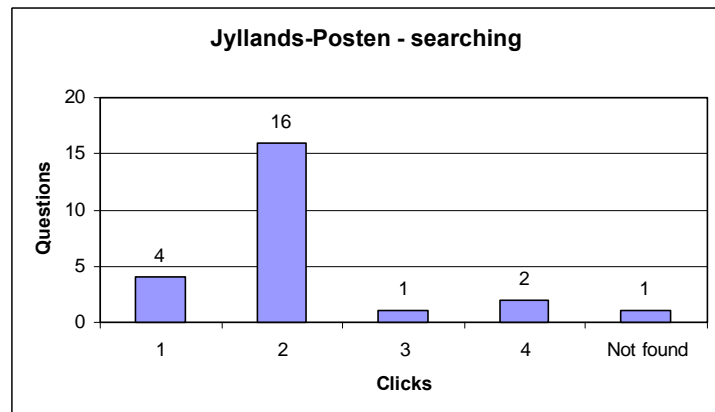


Table 4 Amount of clicks necessary to answer questions (JP)

Landmarks

The participants knew in which section of the web site they were at the time of asking. *"I'm on the foreign page, I see that in the navigation."* The left navigation menu with its arrow, together with the headlines of the articles presented at each page, served as a landmark which the participants used it in order to orientate themselves.

Consistency

None of the participants commented specially on consistency but the general opinion was that it was easy to navigate. *"The site isn't so big – it's easy to find things"* and *"It feels clear and sharp"* were some of the remarks made by the participants.

Metaphor

All the participants perceived the web site like as a newspaper: *"Large headings, introductions and it is in two columns. The fact that it's the latest news makes it feel like a paper."* During the search-phase of the test the participants did not find it difficult to find the answers to the questions asked. Four answers were found after one click and 16 more after two clicks. They connected the questions to the right section; Inland, Udland, Sport and so on almost immediately. The question not answered was to be found in the IT & Computer section.

URLs

One participant used the URL as a landmark, to see where he was. The others did not use or comment the URLs at all.

Titles

None of the participants noticed the document titles and Jyllands-Posten does not provide page titles.

Sitemap & TOC

None of the participants asked or looked for a sitemap or TOC.

Direction and distance

The navigation menu was used for backward navigation. None of the participants used the back button for backward navigation. One of the participants frequently returned to the homepage to start over again while searching for information.

Search facility

Three participants tried to use the search facility without any luck since all results presented lead to articles reserved for the registered users.

Questionnaire

All participants considered getting an overview over the web site early in the test (for more information see Appendix D). They also experienced the possibility of navigating within the web site as quite good. Searching for information was somewhat easy for two participants while two others experienced it somewhat harder. All participants thought that the newspaper had succeeded well with the design of the web site.

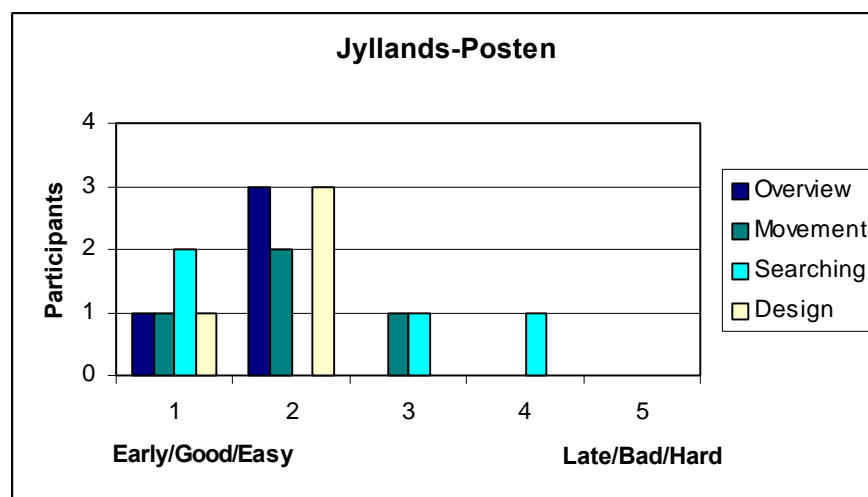


Table 5 – Summary from the questionnaire (JP)

5.2 Göteborgs-Posten

Three participants failed to answer at least one question. The local navigation support in the news section with anchors within the page was not understood by the participants, they scrolled instead. They could not differentiate between the anchors within the page and the links to other pages in the same section either.

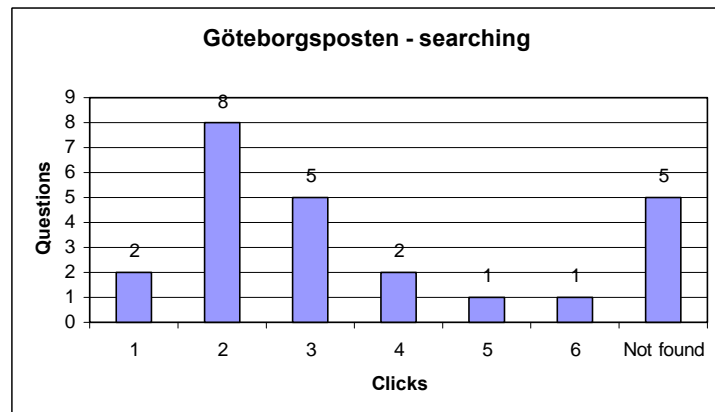


Table 6 Amount of clicks necessary to answer questions (GP)

Landmarks

The participants mostly knew in which section of the web site they were at the time of asking. The participant with the least Internet- experience did not quite understand the question at first, but after rephrasing the question she answered: *"I clicked on West Sweden, then I'm there."* The GP-logotype and its section titles were the landmarks that were recognised the most. *"I'm on travel. I look at the button here (minimised program on the taskbar) where it says GP Travel."* The participant then looked around and pointed out the logotype with the section title. But I also received negative responses to the question of where in the web site they thought they were at a given moment by two of the participants at some point during the test. Two of the participants, for example, knew that they were in the news section at one point but couldn't tell which subsection they were visiting.

Consistency

None of the participants commented specifically on consistency but one participant happened to get outside the web site and did not react to it. *"You think this belongs to the site."* – was the response after I told her she had landed outside the web site via a link from the Travel section (travel weather). The participant was not able to return to the homepage without help, the same goes for another participant who also happened to get outside the web site. One of the participants did experience some problems with orientation - *"It's difficult to orientate in some places."*, while another participant expressed an opposite remark - *"I feel as though I got the idea of how to orientate directly."* The participants did not understand the local navigation system within the news section. One participant commented on this navigation system as I explained it to him after the test - *"I think all the headings should come in one sweep, or so you can get an overview"*. Two of the questions not answered were to be found some levels down in this navigation system.

Metaphor

There were different opinions as to whether or not the web site felt like a newspaper. *"It feels like they've put in the plates they put in the printing press."* and *"Doesn't feel like a newspaper"* were some of the remarks. The participants felt it difficult sometimes to differ between the subsections within the news section, for example

politics and economy, when searching for information. One of the questions not answered where due to that fact.

URLs

One of the participants used the URL for backward navigation while the other three did not comment on or used the URLs at all.

Titles

The document titles where not commented on but the section titles in connection with the GP-logotype were used for orientation.

Sitemap & TOC

None of the participants asked or looked for a sitemap or used the TOC available.

Direction and distance

The GP-logotype was used in order to return to the home page and was recognised by three of the participants. One participant frequently used the back button for backward navigation - *"I think it's quicker than trying to find, because getting back to the first page is not standardised."* Two of the participants were not able to return to the homepage after visiting the subsection "D@gs" and the CD guide, the GP logotype (used for returning to the homepage) is missing in these sections.

Search facility

Two users tried using the search facility on several occasions. They had problems with understanding both how to write the search phrase properly and how to identify which option to select of the results presented. One example of how the results are presented is *"Utrikes senaste nytt www.gp.se"*. But they eventually found some answers to the questions by using this method.

Questionnaire

Getting an overview of the web site was experienced somewhere in the middle of the test by the participants (for more information see Appendix D). The possibility of being able to navigate within the web site was found rather easy by two of the participants and average by the other two. The search for information was experienced very different among the participants, as did their opinions of the web site design.

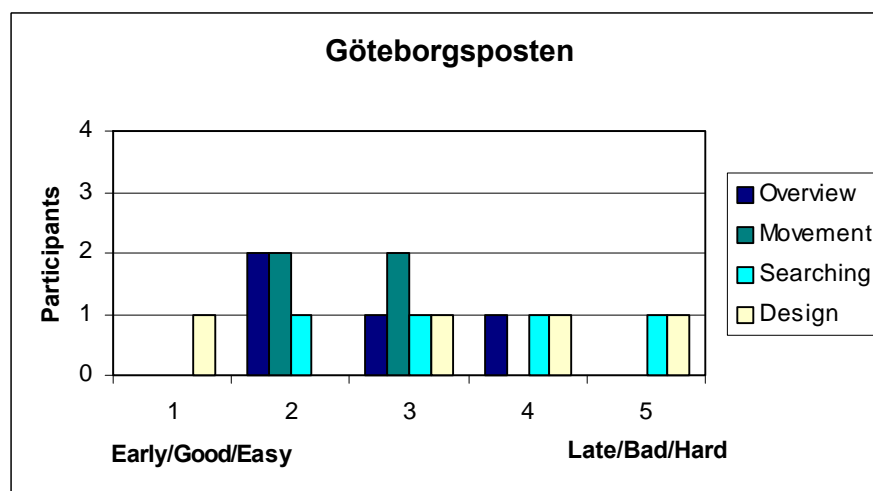


Table 7 – Summary from the questionnaire (GP)

5.3 Dagbladet

None of the participants failed to answer any question. A lot of scrolling was necessary to find the answers of the questions. Most of the questions were answered within two clicks, while some questions took considerably longer time to answer.

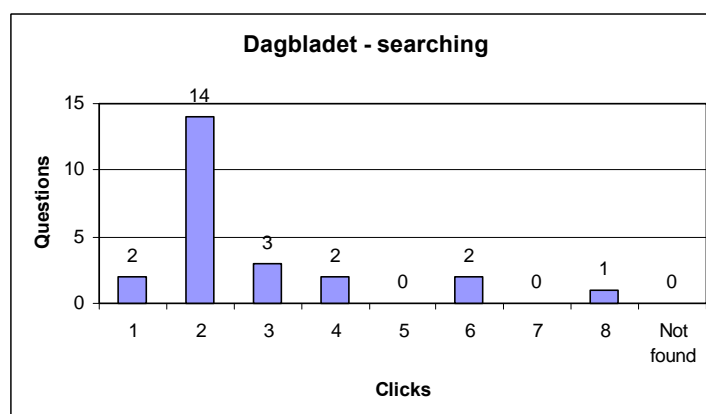


Table 8 Amount of clicks necessary to answer questions (Dagbladet)

Landmarks

Three of the participants knew where they were in the web site each time I asked them. Some remarks were: *"The heading is there"* (looking at the picture) *"the other headings are sport-related"* and *"I suppose I'm on the 'På din side' page. I've structured it in my mind that I went in there and I see it in the menu the last 10."* The top navigation bar with the section titles was mainly used for orientation, but the navigation menu was also used. One participant used the "threading" shown in the top navigation bar as a landmark when asked of his position. One participant failed to recognise where in the structure he was at some point.

Consistency

Two of the participants remarked on the consistency - *"I thought I was still in the sport navigator, but I'm not because it says results over there. I think it's a bit inconsistent."* and *"Now I've learnt that the menu is here on the left and that it means foreign, criminal and politics."* Two participants commented on the structure becoming clearer after a while - *"The structure falls into place after a while, you pick it up pretty quickly."* and *"I didn't think it was so good at the beginning, but it sort of grew after I'd been there a while."*

Two participants were not happy with the design at all - *"There's too much text to be able to focus and concentrate. There's so much here that you nearly miss the last 10 pieces of news."* and *"I think it's a bit messy with different navigators all the time, I get a bit disturbed by it."* were some of the things expressed by them.

Metaphor

All of the participants perceived the web site as a newspaper - *"It reflects what type of newspaper it is"* and *"I think it captures the newspaper structure pretty well without becoming too messy."* were some of the remarks.

URLs

One of the participants used the URL for backward navigation. The other participants did not comment on or used the URLs at all.

Titles

The section titles in the top navigation bar was used for orientation purposes, but none of the participants noticed the document titles.

Sitemap & TOC

None of the participants looked for a sitemap or TOC.

Direction and distance

The top navigation bar with its different options was used for backward navigation, only one participant recognised the logotype for backward navigation though. One participant used the URL for backward navigation as well. One participant recognised the left navigation menu for cross navigation but did not use it, he constantly went back to the homepage to start over again. One participant went outside the web site by following an external link but was able to return to the homepage by clicking at the Dagbladet logotype present.

Search facility

One participant tried to use the search facility without success since he felt that the results presented were very cryptic. “163075.html (Uten tittel)” is an example of how the results are presented.

Questionnaire

Getting an overview of the web site was experienced very different by the participants (for more information see Appendix D). The possibility of being able to navigate within the web site was found rather easy by three of the participants and average by the fourth. The search for information was experienced very different among the participants, as did their opinions of the web site design.

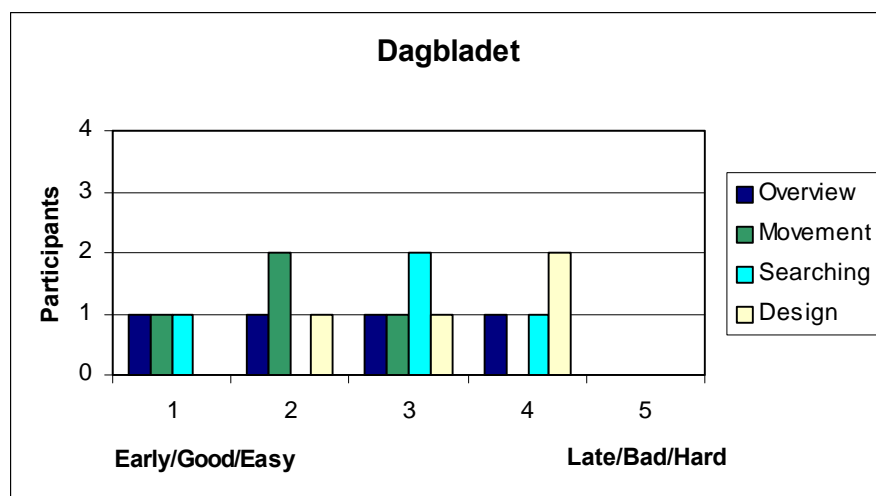


Table 9 – Summary from the questionnaire (Dagbladet)

5.4 General findings

One thing that became quite clear during the tests was that people do not read the online newspaper in the same way they read the printed paper (see question number 1 in Appendix D). The users tend to browse more than they navigate. It is only when they are searching for a special event or article they actually navigate.

"I think you skim differently, it's harder work reading from a computer. You can have a newspaper on your lap, sit comfortably and put your feet up."

"When I read the newspaper it gives me a moment of relaxation, when I read the news on the Internet I do it more to check – has anything happened? I'm much more focused on finding out the news."

The users don't "finish" reading the online newspaper as they do with the printed paper (see question number 2 in Appendix D). *"You finish reading a printed paper. If you're not interested in the home news you turn over that page, but you always come to the end in one way or another. It's not like that here, you wander from one page to the next, so it's not easy knowing when I've finished reading it."* Many of the participants of the usability test did not think they would spend much time reading the online newspaper, they would just browse it in order to glance at the headlines.

Some of the participants of the usability test mentioned that they mostly turned to an online newspaper when looking for something specific.

"I probably wouldn't read the paper on the Internet, really read it, but if I look for something specific, I try to find it and print it out and read on paper later"

5.5 Summary

In the table below I summarise what I have observed, in brief, during the usability test grouped according to the design principles presented in chapter 2.

	Jyllands-Posten	Göteborgs-Posten	Dagbladet
Landmarks	The left navigation menu mainly served as a landmark and all participants knew where in the structure they were when I asked them.	The GP-logotype with its section titles was the landmark mainly recognised. Positive as well as negative responses to the question where in the web site structure they were at the time.	The top navigation bar with its section titles was mainly used for orientation, the navigation menu was used as well. One participant failed to recognise where in the web site structure he was, but the other three knew their position at all times.
Consistency	No special comments.	No special comments.	Two participants commented on the consistency, one in a positive way and the other in a negative way.
Metaphor	All of the participants perceived the web site like a newspaper.	Different opinions.	All participants thought of the web site as a newspaper.
URLs	One participant used the URL for orientation, the others did not comment on or use the URLs at all.	One participant used the URL for backward navigation, the others did not comment or used the URLs at all.	One participant used the URL for backward navigation, the others did not comment on or used the URLs at all.
Titles	None of the participants noticed the document titles and JP does not provide page titles.	The section title in connection with the GP-logotype was used for orientation. The document titles were not noticed.	The section titles in the top navigation bar was used for orientation purposes. The document titles were not noticed.
Sitemap & TOC	None of the participants looked for a sitemap or TOC.	None of the participants looked for a sitemap or TOC.	None of the participants looked for a sitemap or TOC.
Direction & distance	The navigation menu was used for backward navigation.	The GP-logotype was used for backward navigation by three of the participants. One participant used the URL for backward navigation. Two participants were not able to return to the homepage after visiting the subsections D@gs and the CD guide. Two participants failed to return to the homepage after following a link that went outside the web site.	The top navigation bar with its different options was used for backward navigation. One participant used the URL for backward navigation as well. One participant went outside the web site but was able to return by clicking at the Dagbladet logotype present.

6. Discussion

The main purpose of this thesis is to study a number of design principles for navigation support and how this support is used by first time users in an online newspaper environment. Thüning et al. (1995) summarises ten cognitive design issues to support the construction of a mental model, posed as questions, of which I chose six that are relevant for the design of navigation support in a web site environment. In order to tackle these questions I discussed some design principles in chapter 2. I will start by discussing these design principles, one by one, followed by a discussion to answer the six questions and finally I will answer the research question of this thesis: *How is it possible to reduce cognitive overhead in an online newspaper web site for first time users?*

6.1 Design principles

Landmarks

The participants of the usability test used different landmarks in order to orientate themselves. At the JP web site it was mostly the left navigation menu with its arrow that was used but the headlines of the articles served as landmarks as well. All participants who tested the JP web site knew their position when I asked them.

The GP logotype with its section titles was the landmark most recognised by the participants who tested that web site. Two of the participants failed to tell their positions at some point during the test, and they also had problems knowing which subsections of the news section they were visiting. The participants did not understand the local navigation system (see figure 15) within the news section either. They could not differentiate between anchors within a page and links to other pages. It is possible that this kind of navigation support attracts the returning users instead.

At the Dagbladet web site the participants mostly used the navigation bar and menus for orientation. One participant failed to recognise where in the structure he was at some point.

These results suggest that providing landmarks for orientation purposes is quite important. It also indicates that there should not be too many categories. At the JP web site they provide five news-related subsections and at Dagbladet they provide four and the participants did not have any problems with that division. At the GP web site, on the other hand, they provide eleven news-related subsections. The participants of the test experienced problems with that many alternatives available. A solution is to use fewer categories and to provide sub-categories instead like Dagbladet, which offers three sub-categories to the news section. This can be related to the theory of 7 ± 2 alternatives as a maximal cognitive load for the users (Miller, 1956).

Consistency

The interviewee at JP argued that it is important that things should be consistent in the web site and one of the interviewees at Dagbladet also commented on the consistency with facilitating for the users to find their way straight to the item. At GP one of the interviewees expressed that they are working on making the web site consistent in the placement of landmarks etc. The evaluations of the web sites show that the JP and the Dagbladet web sites are very consistent in the placement of the navigation support

and landmarks and with the system of naming of the titles. The GP web site is quite consistent in the “newer parts” but a lot of inconsistency exists in the “older parts”.

The fact that two participants who tested the GP web site were not able to return to the homepage when visiting the subsections D@gs and the CD guide, where the GP logotype (used for returning to the homepage) was missing, confirms that it is important to be consistent with the placement of the navigation support. Two participants who tested the Dagbladet web site did not like the left navigation menu changing constantly depending on which subsection one is visiting. This indicates that this kind of navigation support does not attract the first time users. In order to find out if the returning users appreciate this navigation support, more usability testing has to be carried out.

Metaphor

Most of the participants perceived the three web sites as newspapers. At the JP web site where the newspaper always has served as a metaphor, the participants almost immediately connected the search questions to the right section of the web site. 83% of the questions were answered within two clicks at the usability tests of the JP web site, the corresponding figures for Dagbladet is 66% and for GP 41%. This suggests that the newspaper metaphor is an efficient navigation support in online newspaper web sites. The fact that two participants had problems differentiating between the subsections within the news section at the GP web site indicates that it is important to divide the news section into the “right” categories and label them in a way that feels natural for the first time users.

URLs

None of the interviewees considered the URLs as been very important with regard navigation purposes but GP is using a system for naming the URLs, which can be used for orientation. During the tests three participants used the URLs for orientation or navigation purposes. The use of URLs can be related to the general experience of the web and web browsers and the three participants who used the URLs rated themselves as quite experienced Internet users.

Titles

The usability test results show that the participants did not use the document titles as landmarks at all. The use of document titles can also be related to the general experience of the web and web browsers.

The interviewee at JP stated that document titles, and page titles in particular, are very important. There is a contradiction with that statement because there exist no page titles at the JP web site.

The participants had problems making out the results of the search facilities, which is for example presented at the Dagbladet web site like this: *163075.html (Uten tittel)*. One participant used the button (minimised program) on the taskbar as a landmark and it is the document title that shows on this button. These facts suggest that it is important to provide adequate document titles for first time users as well.

The section titles at the Dagbladet and the GP web sites were frequently used for orientation purposes and that strengthens the reason for providing section- or page titles as landmarks.

Sitemap & TOCs

Sitemaps or TOCs were not asked for, but since they are not offered for the users to use (the existing map at GPs web site is not presented in the navigation), one can not confirm nor exclude their importance by this test.

6.2 Cognitive design issues

How to provide an adequate overview of the hyperdocument?

In this context I place a web site on an equal footing with a hyperdocument. According to the test the newspaper *metaphor* is an effective way to help the user to get an overview in online newspaper web sites. If the web site is divided under the “right” categories, which are recognisable from the printed paper, it helps the user to get an adequate overview. At the JP web site where the newspaper metaphor is very clear, all participants considered they had got an overview of the web site early in the test (see table D-1 in Appendix D).

How to indicate the reader’s current position?

All the newspapers have different solutions to this problem. (JP – arrow and shading out current position, Dagbladet – navigation bar with section titles and GP – logotype together with section title.) Since three participants of the usability test failed to recognise their position in the web site structure at some point during the test, it indicates the importance of providing this navigation support to the users for orientation purpose. All the approaches mentioned are working well and were recognised by most of the participants. It is important, however, to be *consistent* in the placement of this help. Since GP is lagging behind in the “older” parts of their web site in this manner, the participants of the test had problems knowing where they were and how to return to the homepage sometimes during the test.

How to show the way that led to the reader’s current position?

It is only Dagbladet that provides this kind of navigation support. They provide it in connection with the top navigation bar together with the section title (see figure 20). One can see the way one has been taken through the hierarchy like this: *nyheter :på nettet / :krim*. One participant of the usability test used this help to orientate himself, when asked of his position in the web site structure. A discussion was held at JP about providing this navigation support, but they decided to use the system with the arrow in the left navigation menu instead. It is possible that this kind of navigation support is recognised by returning users more than by first time users. By making the “threading” (presenting the way one has taken through the hierarchy) clickable as well makes this *landmark* useful for alternative navigation support.

How to present options for searching new nodes?

By using clear and distinct labelling of the options provided. To be *consistent* in the placement of the navigation support. To provide alternative navigation support serving as *landmarks* as well. All the participants who tested the JP web site experienced navigating within the web site as quite easy. At the GP web site two of the participants found it rather easy to navigate and the other two rated it medium. Three participants found it rather easy to navigate and the fourth rated it medium at the Dagbladet web site (see table D-2 in Appendix D). This suggests that all three web sites have a structure that is rather clear for first time users.

For the users who return on a daily basis, one way is to provide alternative navigation support as Dagbladet does with their left navigation menu with its thematic options. It can be seen as a challenge to discover new ways to navigate. Some of the usability test participants expressed that the feeling of the Dagbladet web site structure sort of grows on you after a while.

The search facilities at the Dagbladet and the GP web sites was found hard to use by the participants. (The results at the JP search facility are presented with links that is reserved for the registered users.) Searching for information was found very different among the participants (see table D-3 in Appendix D). This suggests that more can be done in order to facilitate for the first time users to search the web sites.

How to support navigation with respect for direction?

Two of the usability test participants frequently returned to the homepage to start over again while searching for information. Returning to the start upon making an error at a deep level in the menu suggests the absence of survey knowledge and a strong reliance on landmarks (e.g., the start menu) for navigation (Dillon et al., 1990). It also suggests that route knowledge becomes useless once a wrong turn is made. As many users prefer to start from the homepage, it is a good idea to be consistent in providing navigation support for returning to the homepage from all services within the web site.

Three of the participants who tested the GP web site used the GP logotype for backward navigation, but only one recognised the Dagbladet logotype for that purpose. Since the Dagbladet logotype is embedded in the top navigation bar it is probably better to separate the logotype from the navigation bar for navigation purpose instead.

How to support navigation with respect for distance?

GP provides several links that lead outside the web site. If you want to keep the user within the web site this can be dangerous. Two of the usability test participants happened to get outside the web site during the test and were not able to return to the homepage without help. Dagbladet sometimes requests a connection back to their homepage when linking to services outside their web site in order not to loose their users. It can, however, be of interest to provide links to other web sites as a service to the users; in that case it is important to make the user aware of the fact that the links lead outside the current web site. This can be accomplished by collecting such links on a special page named "links" or by just putting the links together in a special place on the page with a heading that clearly shows that these are external links. Letting an external link open up a new web browser window is also an alternative solution to this problem.

6.3 The research question

How is it possible to reduce cognitive overhead in an online newspaper web site for first time users?

The test has shown that the answer to that question is to use the newspaper metaphor as clearly as possible. By using the newspaper metaphor the first two stages in acquiring a cognitive map according to Dillon et al. (1990) are achieved. To structure the web site in a way that feels natural and intuitive for first time users, making it possible for them to connect to it as they connect to the printed paper.

Initially I presented three statements, according to Thüring et al. (1995 p.59), that orientation support should be provided to enable users:

1. *“To identify their current position with respect to the overall structure;*
2. *To reconstruct the way that led to this position; and*
3. *To distinguish among different options for moving on from this position.”*

By using the newspaper metaphor and providing navigation support that is consistent in their placement all over the web site and by providing clear and distinct labelling of the different sections serving as landmarks as well, the first and third of the statements above are fulfilled. The second statement can be fulfilled by using the kind of “threading”, used by Dagbladet to present the way one has taken through the hierarchy.

According to the usability test JP has succeeded best in reducing the cognitive overhead for first time users. This can be due to the fact that the web site is quite small (in its free parts) compared to the other two web sites and that the web site is very focused on news. The structure is clear and the participants got an overview early in the test situation. The newspaper metaphor is very clear at this web site. All participants of the test thought that JP has succeeded well with the design of the web site (see table D-5 in Appendix D).

The “newer” parts of the GP web site are very consistent in their use of navigation support and I think that the usability test carried out by them was of great help to the new design. But the inconsistency in the “older” parts kind of lower the impressions of the web site. The participants of the usability test experienced the design very differently (see table D-5 in Appendix D).

The Dagbladet web site, which was hard to overview in 1996 and has gone for a minimal design, can still be hard to grasp for first time users. The participants of the test were all first time users and did not quite agree with its design (see table D-5 in Appendix D), but two of them expressed that it sort of grew after a while. It feels like they have almost succeeded with their catchword “read more – click less”.

6.4 The longitudinal perspective

JP has given the Internetavisen its own profile and has separated it from the mirror of the printed paper, a section now called Morgenavisen, in connection with the latest redesign in order to make the Internetavisen a “pure” Internet newspaper. They have also made an effort to make the web site more logically structured than before. The GP web site has been stripped of the Java-scripts and frames in order to speed up the access to the homepage in the latest redesign and they have worked out a design concept to make the web site more consistent. Dagbladet have also gone from an elaborate design to a minimal design and are aiming at maximising user-friendliness. All three newspapers have conducted usability tests in one way or another and these facts shows an awareness in the newspapers for the importance of increasing usability in their web sites.

All three web sites have approximately the same number of daily users today and the fact that JP was lagging behind regarding number of users in 1996 has changed since then. In 1996 the numbers of users were somewhere between 3.000 to 5.000 per day in the three web sites, that figure is today about 27.000. In the past three years JP has gone from three part-time employees to ten full-time places, Dagbladet has gone

from four part-time and three full-time employees to a staff of twenty-six. GP, on the other hand, still have five employees and the only difference is that all of them are now working full-time. With this in mind it is not strange that the web site is lagging behind in the updates of the “older” parts. It is possible that by incorporating the “older” part of the GP web site in the new design concept as well will contribute to reducing cognitive overhead for first time users.

6.5 Generalisation and validity

The usability test conducted for this thesis was special for the news-related parts of three online newspapers. Online newspapers are often much more than just the news-related parts, many different services can be provided for the users. Even though it was only the news-related parts that were tested, the design principles that worked well are so general and were all discussed with a large web site in mind and they are applied all through these three newspaper web sites as well. This also suggests that they could be used in other types of web sites but in order to make such a statement, more usability tests need to be conducted.

The newspapers are so different in style and content that it is not possible to come to any conclusions by comparing them to each other. I can only refer to how the participants of the usability test experienced them and compare that to the interviews and evaluation results.

Since only four people tested each web site it is not possible to generalise from this usability test, only indications can be expressed.

The fact that most of the participants had a rather high computer experience and a formal education could have affected the test somewhat even though this test group very much fits the profile of the average user of these three web sites. The Internet experience of the participants was evenly spread, but that is something one has to expect from a general audience of the web and should not be seen as a limitation of this usability test.

6.6 Reflections and further work

It would have been desirable to be able to conduct a second usability test two weeks after the first. Doing so would have contributed to this study by including not only first time users but returning users as well. The time perspective is important since a returning user can take more time acquiring a cognitive map. Each web site was only tested by four participants, it would also have been desirable to have tested each web site with all twelve participants. I was not able to accomplish this due to the lack of time by both me and the participants of the usability test.

Looking back at the usability test it would have been desirable having access to the whole JP web site through userID and password in order to make the three web sites more comparable.

I thought that I would experience more difficulties conducting the interviews with the interviewees from the foreign countries than I actually did. The interviewees in Norway and Denmark were used to conversing with people from Sweden and I had no problems understanding them.

The first part of the usability test when the participants should read the online newspaper as they normally read the printed paper was an obstacle for some of the

participants who tested the foreign web sites. This was not a problem during the search phase, though. It is possible that it would have been better to test just Swedish web sites with Swedish participants.

The roll as a test leader was new for me and could be seen as one of the lack of resources for this study. It is possible that a more experienced test leader would have been able to come to more conclusions.

I think that it is essential to conduct more usability tests in order to formulate relevant design principles for navigation support. It would be of interest to test all services within an online newspaper instead of just the news-related parts in order to find out how the users relate to the whole concept. Conducting more tests by a quantitative method such as online questionnaires to get a larger research material in order to be able to generalise would also be of interest.

7. Conclusion

The usability test of the three online newspaper web sites has shown that the use of landmarks for orientation purposes, and consistency in their placement is important. Not too many menu alternatives should be provided and it is essential to offer a connection back to the homepage from all services within the web site. The newspaper metaphor and the labelling of the different sections according to it, works very well as navigation support in these three web sites. The URLs and document titles can be related to general web experience but one thing that speaks for providing relevant document titles is the fact that they are used to present the results of the search facilities. The search facilities were found hard to use by the participants of the usability test. Since sitemaps or TOCs are not provided at JP and Dagbladet web sites and the sitemap available at the GP web site is not presented in the navigation menu, one can not confirm nor exclude their importance by this test.

The fact that almost all participants were able to determine their position within the JP and the Dagbladet web sites when I asked them, and that only one question was unanswered during the usability tests, suggests that these newspapers have succeeded quite well in reducing cognitive overhead for first time users in the news related parts of their web sites. This can be due to the fact that all of the web sites in one way or another have tested the usability of their web sites. But the fact that two out of four participants who tested the GP web site failed to recognise their position at some point during the tests and that five questions remained unanswered, indicates that more can be done at this web site in order to reduce cognitive overhead.

Since most online newspapers have users who return on a daily basis, designing navigation support for these web sites can be seen as a compromise between optimising the navigation support for the first time users and challenging the returning users by providing alternative navigation support. I think that Dagbladet has succeeded best in this context.

Some of the participants of the test mentioned that they mostly turned to an online newspaper when searching for something specific. When searching for specific information navigating is necessary, if not the search facilities are used. This fact strengthens the reason for providing efficient navigation support and search facilities that are easy to use.

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Internet:

- [1] <http://www.useit.com/> 1999-02-17
- [2] <http://www.ileaf.com/> 1999-05-13

Appendices

Appendix A – Definitions

Anchor – An area within the content of a hypertext node (e.g. a web page) which is the source or destination of a link. A source anchor may be a word, phrase, image, or possibly the whole node. A destination anchor may be a whole node or some position within the node.

Homepage – The main page of a web site. Typically, the home page serves as an index or table of contents to other documents stored at the site.

Node – A hypertext document (e.g. a web page).

User / reader – An individual who uses a computer. This includes expert programmers as well as novices. One can also refer to the user as the reader when it comes to hypertext documents as well as online newspapers.

Web site – A site (location) on the World Wide Web. Each web site contains a homepage, which is the first document users see when they enter the site. The site might also contain additional documents and files. Each site is owned and managed by an individual, company or organisation.

URL – Abbreviation of *Uniform Resource Locator*, the global address of documents and other resources on the World Wide Web.

Appendix B – Interview guide

General:

- Name, background, work assignment, how long have you worked with Internet publishing?
- How large a version of the printed newspaper? (With regard to size countrywide?)
- Number of hits a day?
- Main product?
- Target group?
- Aim with web site – today?
- The object with web venture?
- Which different services exist today?
- Technique for publication – how does it work in a practical sense?
- How many people work with the web paper today, which tasks?
- How is the work organised to cope with the daily updates? Who is responsible for what, for all the sub-web sites? Presentation of the Internet editorial staff.
- How often are the different sections updated?
- Are there any services on the web site that costs money for the user?
- How large a part of the printed paper is on the web?
- How important is the web site seen to be in relation to the printed paper?
- Future? New services?

Design / navigating:

- Who did the present design? Has a web bureau been involved?
- How does your navigation system work?
- How were the present navigation captions chosen?
- How has the site been developed over time? How can new services be adapted?
- Explain what you do when you handle new services, i.e. sub-sites with regard to design and navigation?
- Discussion relating to navigating; [URL's](#), titles, alternative navigation, sitemaps etc.
- Has the web site been user-tested? How? Result?
- Is there any special part of the web site that you would like to have usability tested?

Appendix C – Examples of questions

Jyllands-Posten:

How old is the Queen Mother of England?

Where did the Serb and Albanian delegates meet for peace negotiations?

In what way did Al Gore consider that he had invented the Internet?

Göteborgs-Posten:

How many people have paid to take the University Admissions Test (Högskoleprovet) this year?

When is Bill Clinton going to meet Yasser Arafat?

When did the Dow Jones Industrial Index pass the magical 10,000-point level for the first time?

Dagbladet:

When did Mandela visit Oslo?

What are Sinéad O'Connor and Tomas Dolby doing on the Internet tonight?

How many members of the UCK- guerrilla movement have been killed in Kosovo?

Appendix D – The questionnaire

1. How did you find reading the newspaper on the Internet compared to reading a printed paper?

Jyllands-Posten:

“A better overview of the articles. Seems very easy to find what you're looking for. But you lose the feel of having a freshly printed paper in your hand, which feels different.”

*“Internet **à** very well formulated news
'ordinary paper' **à** both news and relaxation.”*

“Miss the physical contact with the paper. Though it does feel as though the Internet paper has more depth than the printed.”

“I prefer the printed paper because it offers a different general picture of things – you can skim and get a general idea of the contents quicker & easier.”

Göteborgs-Posten:

“Really different, a bit difficult to find things at the beginning, but became easier later on. Easier to read than the newspaper. Clearer texts.”

“More difficult, you miss the overview. You can't have the newspaper on your knee! I think maybe I've missed something.”

“Very laborious, feels like it takes much longer. Uncomfortable.”

“Would rather have read the paper version. Not enough colours. The page doesn't draw attention to itself. Not enough pictures.”

Dagbladet:

“Different way of looking for news etc. Much more to read and find. Latest news.”

“Hard work, more difficult to find on the light screen. Longer time.”

“Compressed, muddled, at times difficult to find.”

“A complement to the subscribed paper. Too expensive to subscribe to another paper just for a few articles now and then. Latest news, good service. I'm used to it, no problems if good structure, longer articles can be printed out.”

2. When did it feel like you had stopped reading the paper? How much time would you put into reading an Internet paper?

Jyllands-Posten:

“Very quickly! I would probably just check it very quickly if I weren't looking for a specific piece of news. 5 minutes if I didn't have any special area of interest in this particular newspaper.”

“2 - 3 minutes.”

“In my estimation maybe 5 - 8 articles and 15 - 20 minutes.”

“Not such a long time to read, but to search on the other hand – if I was looking for something specific.”

Göteborgs-Posten:

“After about ½ an hour. Certainly an hour or so, and then maybe a few times during the day.”

“I hadn't finished reading the paper before I'd tested all the headlines. It took such a long time and it's hard work reading from the screen. Ca 15 minutes at the most.”

“You're finished when you have skimmed through the news headlines. Time: depending on headlines, minimum 20 seconds to 30 minutes.”

“I would have got tired and bought a paper version (after 5 minutes)”

Dagbladet:

“Ca 30 min”

“Read headlines 15 - 20 minutes.”

“10 minutes, I read the headlines and looked at things that interested me.”

“Not long. Interested in many articles – print out, read the paper copies.”

3. When did you feel you had an overview of the contents of the web site?

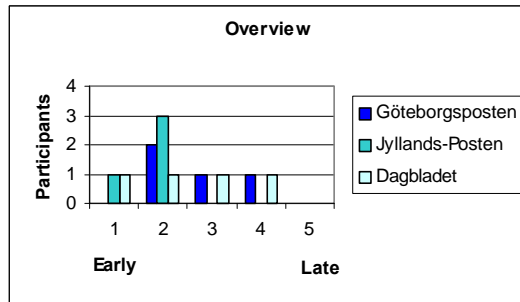


Table D-1 Overview

4. How did you like the possibility of being able to navigate within the web site?

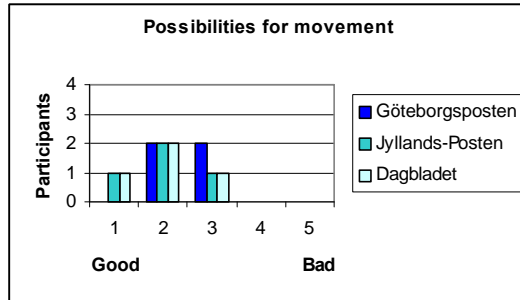


Table D-2 Possibility for movement

5. How did you experience searching for specific information within the web site?

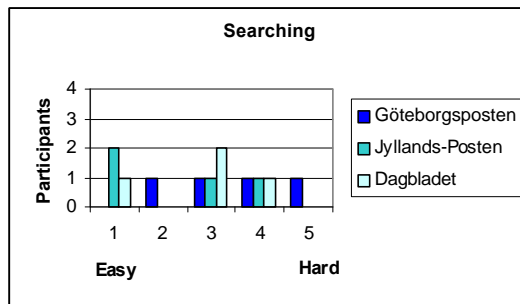


Table D-3 Searching

6. How much of the web site do you think you have seen? (In %)

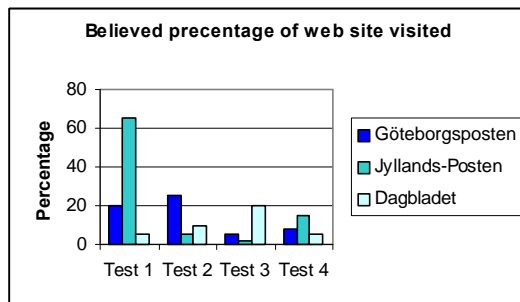


Table D-4 Believed % of web site visited

7. How do you think the newspaper has succeeded with its design of the web site?

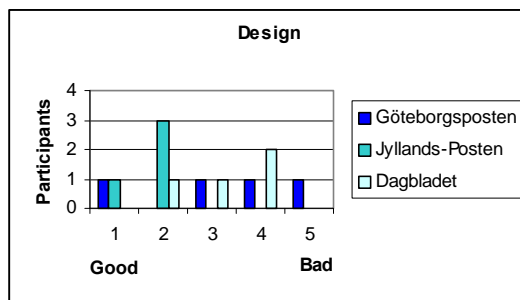


Table D-5 Design